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Control of Air Pollution From New Motor Vehicles and New Motor Vehicle Engines; Final High-Altitude Emission Standards for 1982 and 1983 Model Year Light-Duty Motor Vehicles

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 86

[Docket No. A-79-14; AMS-FRL 1619-5]

Control of Air Pollution From New Motor Vehicles and New Motor Vehicle Engines; Final High-Altitude Emission Standards for 1982 and 1983 Model Year Light-Duty Motor Vehicles

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: This action establishes as a final rule exhaust and evaporative emission standards for 1982 and 1983 model year light-duty vehicles (LDV) and Light-duty trucks (LDT) sold for principal use at altitudes above 4,000 feet. Specific vehicular regulations at high altitude are necessary because the effect of the lower air pressure at high altitude is to increase the exhaust and evaporative emissions well beyond the low altitude standards.

This action is intended to provide improved air quality in high-altitude urban areas in the interim before the 1984 statutory high-altitude standards become effective. This two-year interim standard will reduce unburned hydrocarbon emissions by about 33,000 tons and carbon monoxide emissions by 1,195,000 tons. The total cost of this regulation to the nation is about $22 million.

See Supplementary Information for expanded summary.

EFFECTIVE DATE: Effective November 7, 1980.

ADDRESSES: Copies of material relevant to this rulemaking action are contained in Public Docket No. A-79-14 at the U.S. Environmental Protection Agency, Central Docket Section, (A-130), West Tower Lobby, Gallery 1, 401 M Street SW., Washington, D.C. 20460. The docket may be inspected between the hours of 8:00 a.m. to 4:00 p.m., Monday through Friday. A reasonable fee may be charged for copying services.

FOR FURTHER INFORMATION CONTACT: Richard Wilcox, Emission Control Technology Division, Environmental Protection Agency, 2565 Plymouth Road, Ann Arbor, MI 48105, 313-668-4390.

SUPPLEMENTARY INFORMATION:

Expanded Summary:

This action establishes as a final rule exhaust and evaporative emission standards for 1982 and 1983 model year light-duty vehicles (LDV) and light-duty trucks (LDT) sold for principal use at altitudes above 4,000 feet. Specific vehicular regulations at high altitude are necessary because the effect of the lower air pressure at high altitude is to increase the exhaust and evaporative emissions well beyond the low altitude standards. Nevertheless, the constraints set by the legal authority for this action (section 202(f) of the Clean Air Act as amended in 1977) generally imply numerically higher standards for this interim rule than are found in the corresponding low-altitude standards. In contrast, the 1984 statutory mandate for high-altitude vehicles requires numerically identical standards.

The emission standards being established for LDVs are 0.57 g/mi hydrocarbons (HC), 7.8 g/mi carbon monoxide (CO), 1.0 g/mi oxides of nitrogen (NO_x), and 2.6 g/test evaporative HC. In addition, waiver standards for CO (11 g/mi) and NO_x (1.5 g/mi) corresponding to the previous waiver determinations made under Section 202(b)(5) and (6) are provided. The standards for LDTs are 2.0 g/mi HC, 26 g/mi CO, 2.3 g/mi NO_x and 2.6 g/test evaporative HC. All vehicles sold for principal use above 4,000 feet must be capable of meeting these standards at a test altitude of 5,315 feet (± 328 feet).

This rule requires that for any engine family (except exempted ones) to receive a certificate of compliance, it must be capable of meeting both the applicable low- and high-altitude standards, or at least be capable of being modified or recalibrated to do so. In the NPRM, EPA proposed that any necessary modifications be capable of being done within a $40 limit, even if done as a retrofit to an in-use vehicle. This limit is eliminated in this Final Rule.

Exemptions may be granted for certain low-power vehicles which would be expected to have unacceptable performance at high altitude and which may have unacceptable performance at high altitude and which may have technical difficulty in meeting the high-altitude standards. Such vehicles are designed principally for high fuel economy at low altitude and are incapable of providing satisfactory performance at high altitude. Such exempted LDVs and LDTs could not then legally be sold for principal use at high altitude. LDT exemptions may also be granted for up to 30 percent of a manufacturer's projected LDT sales at high altitude in the 1982 model year in lieu of the performance exemption. This is to ease the certification burden for the industry. This exemption is provided for the 1982 model year because of the short leadtime remaining before the effective date of these regulations. Such exempted 1982 LDTs could still be sold for principal use at high altitude since the exemption in this case is based only on certification leadtime considerations and not on expected unacceptable performance characteristics.

This action is intended to provide improved air quality in high-altitude urban areas in the interim before the 1984 statutory high-altitude standards become effective. This two-year interim standard will reduce unburned hydrocarbon emissions by about 33,000 tons and carbon monoxide emissions by 1,195,000 tons. The total cost of this regulation to the nation is about $22 million.

I. Background

EPA has found that motor vehicles which demonstrate compliance with emission standards at low altitude produce as much as 50 percent more exhaust hydrocarbons (HC) and nearly 100 percent more carbon monoxide (CO) when tested at 5,000 feet above sea level. The Agency has also learned that, in most high-altitude urban areas, motor vehicles account for more than half of the total HC emissions and almost all of the CO emissions. These emission levels combine with summer sunlight and stable winter atmospheric conditions to cause numerous violations of the ambient air quality standards for oxidant and CO in high-altitude metropolitan areas.

During model year 1977, EPA regulations required that new light-duty motor vehicles sold for principal use at high-altitude demonstrate compliance with the applicable emission standards at high altitude. One result of this requirement was that some motor vehicle manufacturers chose not to be certified for principal use at high-altitude, all of the models in their product lines. The limitation in the number of models available for sale in these areas generated an adverse reaction among the affected vehicle purchasers and automobile dealerships. With passage of the Clean Air Amendments of 1977, the Congress, in section 213 of those amendments (section 202(f) of the Clean Air Act, as amended), revoked the EPA high-altitude motor vehicle certification regulations, prohibited the establishment of any other regulations governing the sale or distribution of motor vehicles at high altitude before 1981, and required that, beginning with the 1984 model year, all new light-duty vehicles (LDVs) comply with the applicable emission standards regardless of the altitude at which they are sold.

For the interim period between model years 1981 and 1983, the Congress has given EPA authority to promulgate regulations affecting the distribution and sale of new motor vehicles at high altitude, including the establishment of high-altitude emission standards. Such standards, however, may not require a percentage reduction in vehicle emissions at high altitude that exceeds the comparable percent reduction provided by section 202(b) of the Act for LDV's (generally for HC and CO these standards could represent a 90 percent reduction from the 1970 high-altitude base-level). In no event, however, may numerically more stringent standards be established for high-altitude areas than are applicable under non-high-altitude conditions. For example, EPA may not require an oxides of nitrogen (NO_x) standard numerically lower than the 1.0 gram per mile (g/mile) standard that will be in effect at low altitude on model year 1982.

The high-altitude emission standards for 1982 and 1983 model year light-duty vehicles and light-duty trucks, which are being finalized in this rulemaking, were proposed in the **Federal Register** on January 24, 1980 (45 FR 5988). A public hearing on this proposal was held March 5, 1980 in Denver, Colorado. The record remained open for comment until April 30, 1980. On July 24, 1980, EPA published a policy statement in the **Federal Register** (45 FR 49254) announcing a final decision to delete the proposed $40 limit for modifying a vehicle to conform with the high-altitude standards.

During the public comment period, EPA received an significant amount of information from the concerned public. The EPA staff has summarized and responded to the comments in a document entitled Summary and Analysis of Comments, which is now available through the Central Docket Section, Public Docket No. A–79–14 (see Addresses, above).

II. Components of the Package and Major Issues

A. Standards

The Clean Air Act Amendments established the limiting guideline for the value of the high-altitude LDV standards as a 90 percent reduction from uncontrolled vehicles tested at high altitude, but in no case may the numerical value of the standard be less than the low-altitude standard. Since NO_x emissions decrease as uncontrolled vehicles are driven to higher altitudes, a 90 percent NO_x reduction from these vehicles would be lower than the NO_x values determined for low altitude. Because the high-altitude standards may not be numerically less than the low-altitude standards, the present NO_x standards for the applicable model year and class of vehicle shall apply at all altitudes. For the HC and CO standards, a method for determining the 90 percent reduction was required. In addition, an alternative high-altitude CO standard was required for LDVs that are granted a waiver from the statutory low-altitude standard of 3.4 g/mi, allowing them to emit up to 7.0 g/mi at low altitude.

This action does not establish an interim high-altitude diesel particulate standard for the 1982–1983 model years. Light-duty diesel vehicles and trucks sold in high-altitude areas will only have to comply with the particulate standard at low altitude. EPA will soon initiate a separate rulemaking implementing Clean Air Act section 206(f)(1), which states that: "All light-duty vehicles and engines manufactured during or after model year 1984 shall comply with the requirements of section 202 of this Act regardless of the altitude at which they are sold." In this rulemaking, EPA will also evaluate a high-altitude particulate standard for light-duty motor vehicles.

1. *Derivation of gaseous emission standards for non-waivered vehicles.* EPA believes that Congress, in amending the high-altitude provisions of the Clean Air Act, intended that high-altitude LDV emission standards be determined by simply establishing a 90 percent reduction from a baseline fleet of representative high-altitude vehicles. Ideally, the same vehicle fleet which was used to establish the low-altitude standards should be used to determine the high-altitude baseline. Since this fleet no longer exists as tested, an alternate method was necessary.

Recent testing of a 1970 fleet of 25 light-duty vehicles was performed under the direction of the Motor Vehicle Manufacturers Association (MVMA) at low altitude (St. Louis, 600 feet), and at high altitude (Denver, 5,400 feet).[1] The results of the MVMA tests yielded average fleet emissions of 2.85 g/mi HC and 20.45 g/mi CO at low altitude, and 4.47 g/mi HC and 64.4 g/mi CO at high altitude. The MVMA low-altitude baseline values compare with 4.1 g/mi HC and 34 g/mi CO which are generally accepted as the low altitude LDV baseline values. Because of the disparity between the two sets of low-altitude baseline values, EPA determined the high-altitude exhaust emission standards by deriving a low-to-high altitude correction factor from the MVMA baseline data. This factor was then applied to the existing low-altitude standards. Without using this methodology, a simple 90 percent reduction from the MVMA baseline data would have yielded potential high-altitude standards of 0.45 g/mi HC and 6.4 g/mi CO. EPA believes that these latter standards are more stringent than those Congress envisioned.

In developing the correction factor, EPA assumed that the change in vehicle exhaust emissions is directly proportional to the change in altitude. Therefore, the relationship between light-duty vehicle emissions and altitude can be described by the equation:

$$\text{Baseline at Altitude} = \text{Baseline at Low Altitude} + \left[\left(\frac{\text{Change in Emission}}{\text{Change in Altitude}}\right) \times \text{Change in Altitude}\right]$$

If the emissions at low altitude are assumed to be the low-altitude baseline value, then high-altitude baselines can be established from:

$$\text{Emissions at Altitude} = \text{Emissions at Base Altitude} + \left[\left(\frac{\text{Change in Emission}}{\text{Change in Altitude}}\right) \times \text{Change in Altitude}\right]$$

[1] Draft Society of Automotives Engineers paper by J. B. Edwards, et al., dated June 11, 1979 and entitled "1970 Passenger Car High Altitude Emission Baseline."

As previously stated, the generally accepted low-altitude LDV baseline values are 4.1 g/mi HC and 34 g/mi CO. The average emissions for the MVMA fleet are 2.85 g/mi HC and 20.45 g/mi CO at the St. Louis altitude (600 feet), and 4.47 g/mi HC and 64.4 g/mi CO at the Denver altitude. Substituting the appropriate values into the equation yields:

$$\text{HC Baseline at Altitude} = 4.1 + \left[\frac{4.47 - 2.85}{5400 - 600}(5400-600)\right]$$

$$\text{HC High-Altitude Baseline} = 5.7$$

Taking a 90 percent reduction from this baseline yields a high-altitude HC standard of 0.57 g/mi (at 5,400 feet).

Similarly for CO:

$$\text{CO Baseline at Altitude} = 34 + \left[\frac{64.4 - 20.4}{5400 - 600}(5400 - 600)\right]$$

$$\text{CO High-Altitude Baseline} = 78$$

Again, taking a 90 percent reduction yields a high-altitude CO standard of 7.8 g/mi.

The proposed high-altitude standards for LDTs are determined in a different manner from the LDV high-altitude standards. EPA used an alternative approach partially because Congress did not mandate, in the Clean Air Act, that the same methodology which is followed for LDVs must also be used to set equally stringent standards for LDTs. In addition, a different approach had to be found because no 1970 LDT baseline fleet tested at both high and low altitudes was available. The Agency's alternative methodology fully responds to the Congressional intent of significantly reducing high-altitude motor vehicle emissions, and in EPA's opinion, represents the best data available.

The high-altitude LDT standards are found by using (1) data from a 1969 LDT baseline fleet which was tested at low altitude, and (2) the absolute difference in the emissions of a 1970 LDV baseline fleet (MVMA vehicles) when tested at both high and low altitudes. If a proportional relationship is assumed between the standards and baseline emissions at high altitude, and the standards and baseline emissions at low altitude, the high-altitude standards can be determined from the following equation:

$$\text{Standards at Altitude} = \text{LDT baseline at (low altitude} + \text{Change in LDV emissions)} \frac{\text{LDT low-altitude standard}}{\text{LDT low-altitude baseline}}$$

By deriving the LDT standards in this manner, EPA assumed that the absolute change in LDT and LDV exhaust emissions with altitude is the same. This assumption is based upon EPA's judgment that the change in emissions with altitude is a function of enriching the fuel-air mixture of the carburetor, and is not significantly affected by the differences in weight or road load between the two categories of vehicles.

The LDT high-altitude standards can be determined with the following information. The 1969 LDT baseline emissions were 8 g/mi HC and 102 g/mi CO.[2] As previously stated, the 1970 LDV baseline values were 2.85 g/mi HC and 20.45 g/mi CO at low altitude, and 4.47 g/mi HC and 64.4 g/mi CO at high altitude. The high-to-low absolute differences are, therefore, 1.6 g/mi HC and 44 g/mi CO. The LDT low-altitude standards for the years in question are 1.7 g/mi HC and 18 g/mi CO. Substituting these values into the above equation yields the following high-altitude standards for LDTs:

$$\text{HC High Altitude Standard} = (8 + 1.6)\frac{1.7}{8} = 2.0$$

$$\text{CO High Altitude Standard} = (102 + 44)\frac{18}{102} = 26$$

[2] "1969 Light-Duty Truck Baseline Program and 1983 Emission Standards Development," EPA Report No. SDSB-79-23, July 1979, in the docket.

The Agency derived the required evaporative emission standards for high altitude by using a ratio concept. This ratio was obtained from a theoretical analysis rather than vehicle test data.[3] The ratio of high-to-low altitude evaporative emissions was determined to be 1.3. Multiplying the low-altitude standard (2.0 grams per test) by this ratio gives the high-altitude evaporative emission standard of 2.6 grams per test.

2. *Derivation of gaseous emission standards for waivered vehicles.* In an approach similar to that used in the previous section, EPA derived the waiver standards by adding to the high-altitude standards, the increments between each of the low-altitude waiver standards and the low-altitude statutory LDV standards. Hence, the CO waiver standard at high altitude is 7.8 + (7.0 − 3.4) = 11.4 g/mi, or, rounding to two signifcant figures, 11 g/mi. The same NO_x waiver standard, from 1.0 g/mi to a maximum of 1.5 g/mi, established for MY 1981–84 diesel vehicle model which may be granted under 202(b)(6) of the Clean Air Act as amended (1977) will be applicable to the same high-altitude vehicle model. Any vehicle which is granted a NO_x waiver at low altitude will be granted the same waiver at high altitude because the Clean Air Act prohibits EPA from establishing high-altitude standards which are numerically lower than corresponding low-altitude standards even though NO_x emissions are generally lower at high altitudes.

The following table summarizes the high-altitude standards at the reference altitude.

Standards at Reference Altitude of 5,315 Feet (Denver Test Site)

	HC[1]	CO[1,2]	NO_x[1,5]	Evap.[4]
LDV 1982–1983	0.57	7.8	[6]1.0	2.6
LDT 1982–1983	2.00	26.0	2.3	2.6

[1] Grans per mile.
[2] CO waiver standard for 1982 LDVs is 11 g/mi.
[3] NO_x waiver standard for 1982 and 1983 diesel vehicles is up to 1.5 g/mi.
[4] Grams per test.
[5] For 1982, American Motors Corporation must meet a standard of 2.0 g/mi NO_x.

[3] "Effect of Altitude on Noncontrolled Evaporative Emissions from Gasoline-Fueled Vehicles," EPA Report No. SDSB 79–01, January 1978, in the docket.

B. Technology Requirements

In model year 1982, EPA expects the automobile industry to employ emission control systems which use three-way catalytic converters ("catalysts") with oxygen-sensor controlled feedback fuel systems on 70 percent of the light-duty vehicles. The three-way catalyst is a device which operates in the exhaust stream of the vehicle. It employs noble metals (typically Platinum and Rhodium) to act as catalysts to chemical reactions which aid in lowering the emission levels of all three regulated pollutants (HC, CO, and NO_x), thus the term three-way catalyst. The noble metals promote the oxidation of HC and CO to form H_2O (water) and CO_2 (Carbon dioxide). At the same time, NO_x emissions are reduced (oxygen is taken away) to result in emissions of N_2 (nitrogen) and O_2 (oxygen).

For this emission control system to operate properly, it is necessary to control the air-fuel ratio which enters the combustion chamber to approximately stoichiometric conditions. (That is, the proportion of fuel-to-air is kept as close as possible to the mixture [approximately 1 part of fuel to 15 parts of air] at which, under ideal conditions, complete combustion of the fuel would take place and would yield only carbon dioxide and water as combustion products). Therefore, manufacturers have developed fuel metering systems to maintain the air-fuel ratio near stoichiometry. This has been accomplished by placing a sensor in the engine exhaust which monitors the air-fuel ratio by measuring oxygen in the exhaust (O_2 sensor signals the fuel system either to add or subtract fuel to regain the stoichiometric air-fuel ratio). This is the oxygen sensor controlled feedback fuel system.

The combination of the three-way catalyst and the O_2 sensor feedback fuel system is very effective at lowering emissions. At the same time, this system tends to be effective at compensating for changes in altitude. As altitude increases, less air will enter for each part of fuel than would occur at sea level. The O_2 sensor will note this excursion from a stoichiometric air-fuel ratio, and the fuel system will then be directed to meter less fuel until the stoichiometric ratio is once again attained. Thus, the emissions of the vehicle will be maintained at a low level even as the air density varies with changes in altitude. EPA believes that the high-altitude standards will assure that these emission control systems are designed and calibrated for high altitudes where emission reductions are required.

The Agency anticipates that the balance of the model year 1982 fleet (i.e., 30 percent of the light-duty vehicles and all light-duty trucks) will typically use either open-loop, three-way catalyst system; oxidation catalysts; or no catalyst at all to control emissions.

Oxidation catalysts are located in the exhaust stream, as are the three-way catalysts. However, the catalytic properties of this device do not promote the reduction of NO_x emissions. Instead, this device only aids in the oxidation of HC and CO.

Because this catalyst does not control emission of NO_x, for which precise air-fuel metering is essential, the air-fuel ratio entering the engine does not have to be maintained at stoichiometry. Therefore, manufacturers do not use oxygen-sensor controlled feedback fuel systems on these vehicles, and generally the fuel metering is calibrated for optimum performance at a fixed barometric pressure.

Similarly, those vehicles which do not use catalysts at all generally employ a fixed calibration fuel system. These vehicles rely upon a combination of other devices to assure that emissions of HC, CO, and NO_x are minimized.

Because these non-three-way systems use fixed-point calibrations for their fuel metering systems, the air-fuel ratio becomes richer (more fuel per unit of air) as the altitude increases. This tends to result in higher emissions of HC and CO at higher altitude. Thus, for these vehicles to comply with emission standards at high altitude, the manufacturers will need to either add compensating devices which will maintain the air-fuel ratio at a constant value as altitude varies or use separate control hardware calibrated especially for high altitude.

C. Selective Enforcement Auditing (SEA)

Selective Enforcement Auditing (SEA) is an emission testing program authorized by section 206(b) of the Clean Air Act for new production vehicles. SEA provides a logical means of ensuring that production vehicles comply with standards at the time of manufacture by testing vehicles at the completion of assembly. In this manner, SEA provides a deterrent to the production of noncomplying vehicles and thus serves to prevent introduction into commerce of vehicles polluting more than allowed by the established standards.

The SEA regulations 40 CFR Part 86, Subpart G, are structured to accommodate these 1982 and 1983 high-altitude regulations. EPA believes that any unique situations which may develop when testing vehicles under high-altitude conditions can be dealt with adequately under the purview of the existing SEA regulations. Therefore, EPA has determined that no regulatory changes to the existing SEA programs are required due to the new standards.

The current SEA regulations (Subpart G of Part 86) require that manufacturers provide the personnel and facilities needed to conduct testing. EPA has determined that existing high-altitude commercial facilities are more than adequate to allow SEA testing. If the manufacturer should not be able to schedule test time at its own or a commercial facility on an "as needed" basis, Subpart G allows that sufficient leadtime can be provided to obtain the use of a high-altitude test facility. If the manufacturer is foreign, then the facilities can be in the home country (or anywhere else) as long as the facilities provide testing capability under high-altitude conditions.

At the present time, only a small proportion (approximately 4.0 percent) of nationwide vehicle sales are expected to occur at high altitude. To the extent that the Agency is satisfied that high-altitude vehicles are not more likely to be in noncompliance with the emission standards than low-altitude vehicles, the proportion of test orders applicable to high-altitude vehicles should generally approximate their sales fraction. Since fewer than 12 tests would be required to complete a typical high-altitude SEA, the total burden on the industry will be minimal. Furthermore, since high-altitude test orders will be a part of a manufacturers quota and the quota would be the same with or without these regulations, the maximum number of SEAs does not increase due to these regulations.

D. High-Altitude Certification

Certification of the high-altitude fleet is essentially the same as certification of the low-altitude fleet, with the exceptions that: (1) the number of emission-data vehicles tested is significantly less under high-altitude conditions and (2) a separate 4,000-mile emission-data vehicle and 50,000-mile durability-data vehicle are not required for high altitude.

The test procedure used for high-altitude certification is the same Federal Test Procedure that is used for low-altitude certification. Subpart B, Part 86 of Title 40 of the Code of Federal Regulations contains this test procedure. The one difference is that testing will be done under high-altitude conditions (i.e., at an elevation of 1,620±100 meters (5,315 feet±328 feet) or under barometric pressure of 83.3 kPa + 1 kPa).

As in the proposal, this final rule provides for the issuance of a single certificate of conformity which will cover both high- and low-altitude configurations of an engine family simultaneously. This is in accord with the requirement that all vehicles must be capable of being modified (if necessary) to meet either the low-altitude standard or the high-altitude standard. Therefore, a revocation of the certificate would halt the sale of both high- and low-altitude vehicles even if only high-altitude vehicles (or low-altitude vehicles) were found to be in noncompliance.

A major change in this final rule as compared to the proposal is that only one emission-data vehicle per engine family will be tested under high-altitude conditions. The proposal would have allowed the Administrator to select any or all of the low-altitude emission-data vehicles for testing under high-altitude conditions. Additionally, one other configuration could have been selected if such configuration was expected to have high emissions when tested under high-altitude conditions. Thus, under the proposal it would have been possible to require more testing to certify the high-altitude fleet (4 percent of national sales) than to certify the low-altitude fleet (96 percent of national sales).

The Agency had never intended to select the maximum number of emission-data vehicles possible under the proposal and, indeed, had estimated that 3 emission-data vehicles per engine family would be the maximum the Agency would ever require (see the Draft Regulatory Analysis in the docket) for certification testing. However, after further analysis, EPA has determined that the testing of one emission-data vehicle per engine family (in concert with Selective Enforcement Auditing) will provide sufficient incentive to the industry to assure EPA that all low-altitude configurations are adequately developed to meet these high-altitude emission standards. Thus, the certification cost of this final rule is significantly less than the certification cost of the proposal and is more in line with the proportions of high- and low-altitude sales.

The one emission-data vehicle per engine family chosen for certification testing under high-altitude conditions will be an emission-data vehicle already chosen for certification testing at low altitude. This ensures that the manufacturer will not have to incur the cost of building and accumulating 4,000 miles on the high-altitude, emission-data vehicle. This Final Rule requires that the manufacturer select the required low-altitude, emission-data vehicle which is expected to have the worst emissions when tested under high-altitude conditions.

Additionally, we have sought to ensure that the manufacturer does not need to run any new 50,000-mile durability vehicles as a result of this rulemaking. In the majority of cases, the high-altitude configuration selected will be in the same family-system combination as the low-altitude configuration and, therefore, the deterioration factor (DF) obtained for the low-altitude, family-system combination will apply to the high-altitude, emission-data vehicle. However, there may be some instances where the modification of the low-altitude, emission-data vehicle for high-altitude testing will create a new family-system combination (such as the addition of an air pump). In these few instances, the Administrator will allow the assignment of DFs based on the testing of low-altitude, family-system combinations similar to the newly created family-system combinations. Thus, these regulations do not impose on the industry any additional cost of running 50,000-mile durability vehicles.

E. Economic Impact

The costs of complying with the 1982 and 1983 high-altitude standards, as with other mobile source regulations, will primarily affect the producers and, ultimately the users, of high-altitude light-duty vehicles and light-duty trucks. High-altitude dealers are also affected by these standards; therefore, the economic impact on their activities is also addressed below. These values were originally calculated with a more stringent 1983 LDT standard than will now be in effect for that model year because of the recent postponement of

the low-altitude LDT standards until 1984. Although this makes the cost of the high-altitude standards somewhat less, the values do not change significantly and have not been revised.

1. *Costs of Manufacturers of High-Altitude Vehicles.* EPA expects manufacturers to incur expenses in three major areas: (1) emission control hardware, (2) development testing, and (3) certification testing. No significant changes are expected in the costs of the existing SEA testing program for two reasons. First, the high-altitude standards will not increase the overall number of SEAs a manufacturer must perform, assuming that the audited vehicles pass their respective tests. High-altitude audits count toward manufacturer's annual quota. Therefore, high-altitude audits are merely substituted for low-altitude audits and do not increase the quota. Second, as described in the Summary and Analysis of Comments (in the docket), manufacturers should experience little or no cost increase in transporting vehicles to SEA test sites or in testing. There also should be no need to expand existing high-altitude testing facilities or to build new ones. EPA has found existing facilities (both commercial and private) to be more than adequate to absorb the added development and certification testing that will be required.

The emission control technology can be grouped into five generic emission control systems for the purposes of analyzing the economic impact of this regulation: (1) unmodified electronic feedback systems, (2) recalibrated feedback systems, (3) aneroid non-feedback systems, (4) air injection non-feedback systems, and (5) diesel engine systems. Each of these systems will have one or more of the previously mentioned costs (hardware, development, and certification) associated with it.

Additional hardware (aneriod controls) will be required only on non-feedback LDVs and LDTs. Also a few GM LDT models will require the addition of air pumps. For high-altitude LDVs and LDTs, the hardware cost is about $2.2 million and $4.2 million, respectively, or a total of about $6.4 million (undiscounted, 1980 dollars).

A significant amount of development testing will be required to establish unique calibrations for all high-altitude vehicle engine families except those using "unmodified feedback systems." EPA estimates the cost of this development testing to be approximately $8.9 million and $5.5 million for LDVs and LDTs, respectively, or a total of $14.3 million dollars (undiscounted, 1980 dollars).

Under the high-altitude certification rules, manufacturers will be required to certify a high-altitude counterpart for each low-altitude configuration within an engine family. EPA has prescribed the high-altitude certification process in such a manner that the cost of the program is minimized, while still providing adequate assurance that high-altitude vehicles are complying with the standards. Manufacturers will not be required to build and accumulate mileage on special high-altitude emission-data vehicles. Deterioration factors (DFs) for high-altitude vehicles will be the same as those developed with low-altitude, 50,000-mile durability vehicles. EPA estimates that high-altitude certification costs for LDVs and LDTs will be a maximum of approximately $632,000 and $211,000, respectively, or a total of $843,000 for the 2-year life of the standards (undiscounted, 1980 dollars).

In summary, the aggregate, 2-year cost of these regulations (1982–83) is estimated to be approximately $22 million (present value at the start of 1982 assuming a 10 percent discount rate).

2. *Costs of Users of High-Altitude Vehicles.* The added cost to manufacturers for development, certification, and emission control system hardware will be passed on to purchasers of high-altitude vehicles. The amount a manufacturer must increase the price to recover its expenses depends on the timing of the costs and of the revenues from sales, as well as on the cost of capital to the manufacturer. EPA's analysis of first price increases for high-altitude vehicles assumed that all fixed costs are recovered by the end of the 1983 model year, i.e., the date these interim standards are no longer effective, and that the manufacturers' cost of capital is 15 percent per annum. Based on these assumptions, the average first price increase for a high-altitude vehicle is about $23. This is comprised of $16 for development, $1 certification, and $6 for emission control hardware. This overall average figure represents a $20 increase for LDVs and a $36 increase for LDTs. Expressed differently, the cost increase for only those vehicles that require modifications, i.e., some feedback LDVs, all nonfeedback LDVs and all LDTs, is $42 for LDVs and $36 for LDTs

EPA expects no change in the maintenance costs of high-altitude vehicles. (Air pumps and aneroids are the only additional pieces of hardware that will be required on some vehicles to comply with the regulations. The remaining vehicles will not have additional hardware, although some will require special high-altitude calibrations. Such calibrations should not change the existing maintenance characteristics of high-altitude vehicles.) These high-altitude standards could potentially affect the fuel economy of high-altitude vehicles, however. In general, it appears that these regulations will have a beneficial effect. Manufacturers are expected to recalibrate many engines to compensate for the effects of high altitude on the combustion process. In particular, the fuel-air mixture for many controlled engines will be leaner than for uncontrolled engines. Because of the very limited data base and the uncertainties involved, EPA will not credit any fuel economy benefit from better high-altitude emissions performance.

3. *Impact on High-Altitude Dealers.* The potential economic impact of these standards on dealerships can be divided into two general areas: reduced model availability and higher vehicle prices. Adverse changes in either area could affect vehicle sales and, hence, dealership profitability.

The 1977 high-altitude regulations resulted in the unavailability of many models and optional engine configurations in high-altitude areas. Manufacturers chose to limit model availability at high-altitude because the small percentage of the market represented by high-altitude sales (about four percent) did not justify the development costs required to certify the emission control capabilities of all their vehicle configurations. Some high-altitude dealers alleged that this resulted in lost sales.

To avoid model availability problems with the 1982–83 interim regulations, EPA is requiring that all models sold for principal use at high altitude (except exempted 1982 LDTs), shall meet, or the high-altitude standards. Since almost all new vehicles will be certified for sale at high altitude, each manufacturer will be more likely to make most of its full product line available to high-altitude purchasers. Conceivably, a manufacturer might comply with the regulations by certifying all models for high-altitude sale but choose not to offer certain models to high-altitude purchasers. The Agency believes, however, that manufacturers will make almost all models available once those models have been certified. An exception might involve certain exempted, low-power vehicles which perform poorly at high altitude. Because the sale of such vehicles for principal use at high-altitude would be unlikely,

EPA has developed criteria to certify them for principal use at low-altitude.

We believe that this control strategy, combined with manufacturers' increased experience with altitude-compensating emission control systems, will keep availability problems well below the 1977 level. Thus, the overall economic impact of the interim high-altitude regulations should be minimal.

If manufacturers recover their costs only on high-altitude sales, the estimated price increase for the average LDV is about $20 and for a LDT is about $36. The overall average will be about $23 per high-altitude vehicle. This represents approximately 290 lost sales per year, or 580 over the 2-year life of the standards. Only those dealers representing manufacturers whose vehicles must be recalibrated to meet the high-altitude standards will be impacted by significantly higher vehicle prices. EPA estimates that 50 percent of the 1000 high-altitude dealers may be impacted by significant first price increases. If equally impacted, each of these 500 dealerships would lose about one sale during the two year period. Therefore, the potential price increase for original equipment vehicles should have no significant economic impact on individual high-altitude dealerships.

In some cases, dealer trades may be adversely affected by the interim high-altitude standards. Dealer trades generally involve small rural dealers who cannot stock a wide variety of vehicles and must trade with large metropolitan area dealers to satisfy customer demand. Therefore, the potential for adversely affecting sales is limited to relatively isolated, rural, high-altitude dealerships which must "modify" low latitude vehicles acquired in dealer trades with low-altitude dealerships. For these isolated dealers, the potential problem should be limited to the relatively few "high demand" vehicles which are expensive to modify into the proper high altitude configuration. Even in these instances, however, only a portion of the potential sales would be lost. Therefore, it is reasonable to assume that any single high-altitude dealership will not be greatly affected by high-altitude standards. The reader is encouraged to examine the more detailed economic analysis for these standards contained in the Regulatory Analysis (in the docket).

F. Air Quality Benefits

The severity of the air pollution problems in the larger, high-altitude cities dictates the need for this regulation. As an example, the Clean Air Act requires attainment of the ambient CO and oxidant standards by 1982. An extension until 1987 can be allowed if all reasonable control measures will not allow attainment of the standards by 1982. Denver and Boulder, Colorado, and Salt Lake City, Utah, require extensions to meet both the ozone and the CO standards. Albuquerque, New Mexico, has both an ozone and CO problem, but is expected to achieve the ozone standard by 1982. Albuquerque, New Mexico, Colorado Springs, Greeley, and Fort Collins, Colorado require extensions to meet the CO standard. These areas also are required to implement an inspection and maintenance (I/M) program to reduce HC and CO emissions. Even with I/M and other transportation control measures, attainment of the standards in the Denver area by 1987 is not assured. Therefore, it is important that the emission control systems used on high-altitude vehicles be designed and calibrated to operate as efficiently as possible to reduce the severity of high-altitude air quality problems.

Projected emissions of CO and HC for Denver with and without the high-altitude standards are shown below for selected years to illustrate the relative impact of these standards on air quality in high-altitude urban areas. These projections are based on vehicle-miles-traveled per day (VMT) of 20.5 million for 1980, 21 million for 1982, 23 million for 1984, and 24 million for 1987, in addition to the fleet emission rates presented in the Regulatory Analysis. (These values were originally calculated with a more stringent 1983 LDT standard than will now be in effect for that model year because of the recent postponement of the low-altitude LDT standards until 1984. However, the values will not change significantly since the absolute reductions in grams/mile for 1982 LDTs are only about 20 percent less than for 1983 LDTs. Therefore, the values continue to be representative and have not been revised.)

In calculating emissions with the 1982 and 1983 high-altitude standards, light-duty vehicles and light-duty trucks are affected by the standards, heavy-duty trucks are not. Forty tons per day of stationary source hydrocarbon emissions are included in the hydrocarbon emission totals for all years.

Denver Area Emissions

[Tons/day]

	1980		1982		1984		1987	
	HC	CO	HC	CO	HC	CO	HC	CO
Baseline	231.7	1927	196.8	1687	162.2	135.8	133.7	1011
With Stds	231.7	1927	196.3	1670	160.8	131.2	132.4	977
Reduction:								
Tons/day	0	0	0.5	17	1.4	46	1.3	34
Percent	0	0	0.3	1.0	0.9	3.4	1.0	3.4

These estimated reductions are comparable in magnitude with other control strategies, which combined together provide a significant reduction in emissions. The estimates assumed the introduction of nationwide control technology designed to meet low-altitude standards but which also provides some compensation to control emissions when the vehicles are operated at high altitudes. Should other technologies, which do not have high-altitude compensation, be utilized for achieving future low-altitude standards, or should the compensating systems not be developed to their full control capability, the uncontrolled high-altitude emissions would be much higher. This would result in substantially higher air quality benefits for this action.

G. Cost Effectiveness

The cost effectiveness of the high-altitude standards was determined by dividing the total cost by the expected emissions reduction. The total cost is approximately $22 million, while the total lifetime emissions reduction in high-altitude areas is about 33,000 tons of HC and 1,195,000 tons of CO. The resulting cost per ton of emissions reduced is $10 for CO and $330 for HC. (These values were originally calculated with a more stringent 1983 LDT standard than will now be in effect for that model year because of the recent postponement of the low-altitude LDT standards until 1984. However, the values will not increase significantly since the absolute reductions in grams/mile for 1982 LDTs are only about 20 percent less than for 1983 LDTs. Therefore, the values continue to be representative and have not been revised.) The high-altitude cost-effectiveness values compared favorably to cost-effectiveness figures for other implemented or proposed control strategies which range up to about $50 per ton for CO and $1,000 per ton for HC.

H. Leadtime

The determination of adequate leadtime involves three central issues: technical complexity, availability of testing facilities, and available personnel. While EPA is in basic agreement with the argument that insufficient leadtime exists for developing and tooling long leadtime items, the Agency rejects the position that major hardware and tooling changes are necessary to accomplish the necessary types of control strategies. The principle control strategy for vehicles that do not have the inherent capability to meet the standards is to lean the fuel-air mixture to promote more complete combustion. After carefully reviewing all of the comments and after conducting an independent investigation, EPA concludes that this enleanment will be achieved with recalibrations of engine and emission control parameters. The required recalibrations may include short leadtime tooling on both feedback and non-feedback systems. As an example, the most critical, or "worst case", hardware modifications include calibration changes to carburetors for non-feedback systems and the addition of electronic components for feedback systems. Other techniques include changes to timing, air pump, and exhaust gas recirculation.

For non-feedback systems, modifying carburetors to attain leaner fuel-air mixtures can be done by using either fixed calibrations or automatically compensating aneroids. Aneroids are currently available on some car/truck models; other models could easily change to existing aneriod controlled carburetors; while still other carburetors could be modified by machining air bleed passages or through simple modifications to castings. The remaining non-feedback carburetors could be redesigned to accept an aneroid only by more complex changes to die patterns. This type of change is a long leadtime modification for which sufficient time is not available. In these instances, however, manufacturers can obtain the same emission control results at the design altitude by using carburetors specifically calibrated for use at high altitude (fixed calibration).

Optimal high-altitude fixed calibrations can usually be achieved by simple machining or readjustment of certain carburetor parameters (e.g., fuel jets, choke, idle mixture, idle speed, power enrichment, etc.), and will not require long leadtime retooling efforts as might be necessary if the whole carburetor casting pattern had to be modified in order to accept an aneroid.

Feedback systems have an inherent capability to compensate for changes in altitude. In this regard, some systems have a greater range of compensating authority than others. Although many systems appear to be able to automatically meet the high-altitude standards, others will need to be recalibrated. As delineated in the comments at the public hearings, leadtime is most critical if a manifold absolute pressure (MAP) sensor must be added to the feedback system. However, MAP sensors are no longer expected to be necessary. Reprogramming the electronic control unit may be required for some vehicles, but it is not as difficult as adding a MAP sensor.

Historically, manufacturers' production hardware calibrations are determined through a series of reiterations which occur throughout the development and certification process. This could require a long leadtime if the calibrations must be developed to a great degree in time for the building of 50,000-mile durability vehicles or, alternatively, at least in time for 4,000-mile emission-data vehicles as would be true for vehicles which must currently be certified for compliance with low-altitude standards. However, this is not the case for compliance with high-altitude standards. Manufacturers will not be required to build and accumulate mileage on high-altitude hardware for 50,000-mile durability or 4,000-mile emission-data tests. Even though preliminary calibrations would be specified to EPA earlier, specific calibrations would not absolutely need to be developed and built until the high-altitude emission tests were ready to be conducted. These tests would not be performed until the 4,000-mile, low-altitude tests had been completed and the vehicles were ready to be modified into high-altitude test configurations.

The concern for the last central issue, available personnel, arises especially in the case of manufacturers who produce both LDV and LDT lines. Because of the short time available before 1982 production begins, some manufacturers may not be able to complete the total development and certification processes for their entire product lines. It is difficult, however, to estimate the magnitude of this problem, except by a comparison with the normal development and certification timeframes.

EPA has concluded that adequate leadtime generally exists for vehicles to comply with the high-altitude standards beginning in the 1982 model year. This conclusion is based primarily on the fact that time is available in which to develop and certify the required "worst case" hardware, i.e., recalibrations of low-altitude engine and emission control parameters. The conclusion is further supported by the fact that most manufacturers already have significant experience with the effects of altitude on vehicle emissions and that many vehicles have already demonstrated the ability to meet the standards.

Nonetheless, EPA is concerned with the uncertainties in the analysis, and the possible limited resources of some truck manufacturers. Consequently, EPA is providing, for the 1982 model year only, an exemption for 30 percent of each manufacturer's projected sales volume of light-duty trucks. These exempted vehicles can be sold at high altitude.

I. Exemptions

EPA has recognized two situations which require exemptions for acceptable resolution. First, EPA wishes to avoid having the most fuel economic vehicles eliminated from the general market because they could not comply with the high-altitude standards. Second, EPA realizes a need to offer relief to the manufacturers because there may be insufficient leadtime available to complete all the development and certification activities for entire vehicle lines for 1982.

Failure to provide these exemptions would have a potentially serious impact on national fuel economy and on model availability to the consumer, regardless of altitude. This would be expected because the rule requires compliance with both the high- and the low-altitude standards (with modification, if necessary) for certification. Failure to comply with either standard precludes certification and, therefore, marketing at any location, regardless of altitude. Many vehicles which are relatively underpowered in order to enhance fuel economy performance are expected to have some difficulty complying. Thus, the rule impacts the fuel economic vehicles more heavily, leading to a potential loss of some fuel economic vehicles and ultimately to an adverse effect on national fuel consumption. In addition, the short time between this promulgation and the beginning of 1982 production, creates problems for manufacturers attempting to complete development and certification for their entire product line. This problem is more pronounced among LDTs because of the magnitude of the technical problems associated with compliance.

EPA has concluded that the criterion for exemption should be based upon unacceptable performance at high-altitude. This should offer relief to those vehicles which might have technical

problems or which have a limited market at altitude because of poor performance and yet allow certification and sale at low altitude, at least. The limit of acceptable performance for each manufacturer will be based upon certain objective and relevant design parameters. These will be the power-to-weight ratio (specifically displacement-to-weight or D/W) and the engine speed (in either the 1:1 gear or in the lowest numerical gear ratio at the manufacturer's option)-to-vehicle speed ratio (or N/V). These two parameters define the overall performance of a vehicle. Each manufacturer will have in a given model year a range of combinations of these parameters, the lower limit circumscribing a well-defined boundary of minimum performance which that manufacturer will judge to be sufficient to be marketable. This curve will then be mathematically shifted to a 16 percent higher displacement to reflect the effect of high altitude (5300 feet). Vehicles of each manufacturers with N/V and D/W combinations that fall on the low performance side of his own curve will be eligible for exemption.

Another exemption will be offered in 1982 only for light-duty trucks in lieu of the performance exemption. This will be a blanket exemption of 30 percent of each manufacturer's projected high-altitude LDT sales. These exempted vehicles, determined at the manufacturer's discretion, can be sold at high altitude, unlike the vehicles exempted under the performance criterion which cannot be sold at high altitude. This broad sales-based exemption scheme is being provided because EPA recognizes the promulgation of this rule leaves truck manufacturers, especially those which also produce cars, with little time in which to complete the development and certification of their entire LDT fleet for 1982. The Agency encourages manufacturers and their dealers to take advantage of the section 215 altitude performance adjustment regulations for exempted LDTs sold at high altitude. These regulations specify simple, relatively inexpensive adjustments which are intended to reduce automotive emissions from vehicles operated at altitudes other than that for which they were originally designed.

The low-altitude vehicles that are exempted from the high-altitude standards on the basis of performance will be required to have a label which simply states that the performance of the vehicle is considered unacceptable for high altitude use because of its poor performance and that it does not comply with the required standard. Similarly, 1982 LDTs that are included within the thirty percent sales exemption will be required to carry labels stating that they are not covered by the emission performance warranty under Section 207(b) (45 FR 30802).

J. Model Availability

High-altitude standards have the potential to adversely affect model availability in four principal ways: (1) vehicles may not be certified for sale at high altitude, (2) trading between low- and high-altitude dealerships may be prevented, (3) the purchase price of a vehicle may be significantly increased, and (4) vehicles may be certified, but the manufactuers may choose not to offer them for sale at high altitude. EPA recognizes that these high-altitude regulations will have some negative impact on model availability but has carefully structured the way in which the standards will be implemented in order to prevent undue hardship either to consumers or to dealers (at *high* and *low* altitude).

The high altitude regulations seek to minimize any negative impact on model availability by requiring that all non-exempt vehicle models be certified to both the low-and high-altitude standards. This is intended to prevent the problem which occurred under the 1977 high-altitude standards where many manufacturers found it more economical to eliminate certain vehicle/engine/transmission/axle combinations from the high-altitude market than to undergo the development and certification expense. Even though it will be possible for manufacturers to certify a high-altitude vehicle in compliance with these interim standards and, then, not offer it for sale, EPA believes the expenditure of some money to develop and certify such a vehicle will make that action impractical. Hence, every low-altitude vehicle should have a high-altitude counterpart available, except, or course, for some exempted vehicles.

The proposed rule sought to minimize potential model availability problems by requiring that all vehicles not automatically complying with the standards (both low and high altitude) must be capable of being modified to comply with the applicable standard at a reasonable expense ($40). This would ensure that vehicle trading between high-and low-altitude dealerships would remain unhindered, since dealers would not be dependent solely on factory installed original equipment as occurred under the 1977 program. Also, EPA reasoned that a limit on the cost of a conversion would minimize the new vehicle price difference between high- and low-altitude versions of the same vehicle for factory installed original equipment. As previously announced in the **Federal Register** (45 FR 49254), EPA found that some modifications were necessarily expensive and that the dollar limit should be deleted in this final rulemaking. The Agency has retained the modifiable requirement for non-exempt vehicles, however, and is convinced that most models will be available in high altitude areas.

Dealer trades will not be excessively restricted because the majority of vehicles will either inherently meet the standards or will be capable of being modified at an affordable price. The new vehicle price increment between high-and low-altitude vehicles is exected to be relatively small since it appears that even the high cost modifications could be ordered as original equipment from the manufacturers at no cost or at a reasonable price.

For example, EPA expected the highest incremental cost for a high-altitude vehicle will not exceed $75 when ordered with original equipment from the factory. The average vehicle cost increment should be about $23. Sales and, therefore, model availability should be impacted only in the relatively few instances where vehicles must be modified at considerable expense (e.g., greater than $150–$200) before they are sold.

Exemptions necessarily affect model availability. EPA believes it has properly circumscribed the exemption rule so that the loss of models at high altitude will be minimized. Furthermore, those models which are lost at high altitude have a minimal market potential there even in the absence of these regulations because of their unsatisfactory performance. The exemption rule will permit low-altitude sales (96 percent of the total market of a model) of vehicle configurations which might otherwise not be sold anywhere for the lack of an acceptable high-altitude modification. Therefore, no impact on low-altitude model availability will result from these standards.

At high-altitude locations, EPA will allow the sale of 1982 model LDTs exempted under the 30 percent sales exemption. The sale of performance-exempted LDTs and LDVs for the principal use at high altitude will not be permitted. The Agency has adopted a separate strategy for 1982 LDTs because leadtime is quite short for this class of vehicles. The sales exemption for 1982 LDTs will significantly reduce the risk of not complying with the 1982 high-altitude standards. To offset the

possible negative impact on LDT availability at high altitude because of the exemption, EPA will allow sales-exempted LDTs to be sold at high-altitudes in the 1982 model year. This strategy will be discontinued in the 1983 model year since EPA does not expect the LDT leadtime problem to occur after 1982.

K. Legal Authority

1. *Basic Authority.* EPA's basic authority for this interim rule lies in section 202(f)(1) of the Clean Air Act. This paragraph repeals the 1977 high-altitude standards and permits future regulations no earlier than model year 1981. Furthermore section 202(f)(2) permits EPA to set such standards with proportional limits (i.e., the same reduction as implied by the low-altitude rules). These standards necessarily would be less stringent than the statutory 1984 rule imposed by section 206(f) which requires the same standard at all altitudes. Inasmuch as this final rule is proportional within the degree of stringency permitted and is applicable after 1981, section 202(f) satisfied.

2. *Liability for Sale.* In this final rule, the vehicle manufacturer is liable for the sale of motor vehicles used principally at high altitudes which are configured to meet low-altitude emission standards. The justification for this position lies in Section 203(A)(1) of the Clean Air Act which prohibits the vehicle manufacturer from the "* * * distribution in commerce, the sale, or the offering for sale, or the introduction or delivery for introduction, into commerce * * * of any new motor vehicle or new motor vehicle engine * * * unless such vehicle or engine is covered by a certificate of conformity issued (and in effect) under regulations prescribed under this part." Section 206(a)(1) provides that a certificate of conformity shall be issued if the Administrator determines that the vehicle conforms to the emission standards prescribed under section 202. The requirement that all vehicles meet the applicable emission standards is clear.

In fact, as a result of the above considerations, this Final Rule has been changed from the proposal. In the NPRM EPA stated that while the sale of low-altitude vehicles for principal use at high altitude would be illegal, the sale of high-altitude vehicles at low altitude would be allowed. This provision was intended to allow low-altitude consumers, whose principal altitude of use is close to high-altitude location, to buy high-altitude vehicles if desired. At such "fringe" locations, a high-altitude vehicle would be expected to have better fuel economy and HC and CO emission characteristics than its low-altitude version.

However, this provision has been dropped in this Final Rule. While HC and CO emissions from a high-altitude vehicle are expected to decrease with altitude, NO_x emissions may increase due to leaner fuel to air ratios. It is conceiveable that if a low-altitude consumer bought a high-altitude vehicle and operated it at low altitude, that vehicle would be emitting NO_x above the level of the statutory low-altitude standard.

This Final Rule requires that high-altitude vehicles be sold only for principal use at high-altitude and that low-altitude vehicles be sold only for principal use at low altitude.

Recognizing the technological difficulties of designing a vehicle which could meet emission standards at all altitudes, this Final Rule does not require that all vehicles automatically be capable of meeting standards at high altitudes, but that they be capable of meeting the standards by adjustment or modification, § 86.082–8(h)(i). The flexibility in the regulation does not relieve the manufacturer of his responsibility to see that the vehicle is in a configuration that meets the standards at the time of sale. Because § 203(a)(1) prohibits the manufacturer from selling a vehicle without a certificate of conformity with the emission standards, sale of a vehicle which conforms only to low-altitude standards for principal use at a high altitude would violate § 203(a)(1) because that vehicle would not retain its coverage under the applicable certificate of conformity, causing the manufacturer to violate § 203(a)(1).

3. *Recall Authority.* This rule requires (sections 86.082–8(h) and 86.082–9(h)) that all light-duty vehicles (LDVs) and light-duty trucks (LDTs) must be capable of complying with both the low- and high-altitude emission standards, "by initial design, adjustment, or modification," with a possible exemption of this requirement for certain low-power, high fuel economy vehicles and some LDTs in the 1982 model year. Accordingly, certificates of conformity certify compliance with both low- and high-altitude emission standards (section 96.082–30(a)(3)). Vehicles sold for principal use at high-altitude locations must have undergone the certified adjustments or modifications, if any, in order to be covered by the certificate.

EPA may perform surveys of in-use high-altitude vehicles to determine whether they conform to the high-altitude standards throughout their useful life (as defined in section 202(d)). Since the high-altitude regulations are being promulgated under the authority of sections 202(a) and 202(f), a manufacturer whose in-use vehicles do not comply with these regulations may be ordered to remedy nonconforming vehicles when it can be determined, from available information, that a substantial number of properly maintained and used in-use vehicles do not comply with these section 202 regulations. In particular, if vehicles sold for principal use at high altitudes do not comply with high-altitude standards when in use, a recall may be warranted. It is possible that a determination of nonconformity at high altitude may also indicate that low-altitude vehicles fail to meet regulatory requirements for low-altitude vehicles. In such cases, the low-altitude vehicles may also be in nonconformity.

4. *Statutory Requirements.* Section 202(f) of the Clean Air Act permits EPA to promulgate interim high-altitude standards only after the Administrator has considered and made a finding with respect to: (1) economic impact, (2) availability of emission control hardware, and (3) the likelihood that any significant improvement in air quality will result.

All three of these issues were specifically addressed in the draft Regulatory Analysis which was prepared as a support document for the proposed standards. These issues were further discussed in the Preamble of the proposal. These issues have again been analyzed for the Summary and Analysis of Comments and the final Regulatory Analysis which support this final rulemaking. These documents are available for public review (See ADDRESSES). Therefore, the Administrator has met the conditions of section 202(f) for promulgating high-altitude standards for 1982 and 1983 model year light-duty motor vehicles.

L. Conflicts With the Parameter Adjustment Regulation

Beginning with the 1981 model year, manufacturers must comply with "parameter adjustment" regulations (44 FR 2960). These regulations will permit EPA, and require manufacturers, to test vehicles with their engines adjusted to any combination of settings within the physically adjustable ranges of their adjustable parameters, as opposed to the previous practice of setting those adjustable parameters to the manufacturer's specifications. For gasoline-fueled LDVs and LDTs with carburetion systems, idle air/fuel mixture and choke valve action (e.g., bimetal spring tension and vacuum pull-off adjustments) will be subject to EPA

adjustment beginning with the 1981 model year, and initial spark timing will be subject to adjustment beginning with the 1982 model year. Gasoline-fueled LDVs and LDTs with fuel injection systems will follow the same schedule, except that choke parameters will not be affected. There is as yet no schedule for adjusting specific parameters on diesel-powered LDVs and LDTs.

Manufacturers will comply by either narrowing the physically adjustable ranges of certain parameters or else making them entirely nonadjustable altogether (i.e., "fix" or "seal" them). Furthermore, for the certificate of conformity to be valid, any mechanism intended to seal or limit the adjustability of these parameters must be in place and effective at the time of original sales. It is likely, however, that all of the parameters which are limited or sealed due to the parameter adjustment regulations will need to be adjusted or recalibrated in order to comply with the 1982/1983 high-altitude standards. This becomes a problem for non-original equipment high-altitude vehicles which might have to be recalibrated in the field (due to a dealer trade for example). Any seal or other limiting mechanism which is defeated in order to recalibrate a parameter to a high-altitude specification must be restored prior to the original sale. This may force the dealer, instead, to replace whole mechanisms, such as the carburetor, to achieve the necessary recalibrations. Such wholesale replacements would have been particularly onerous had the proposed $40 maximum cost for modifications been retained (see 45 FR 49254). This would have been a concern, of course, only for low-altitude vehicles transported to high-altitude areas for sale or relocation. Vehicles originally calibrated for high altitude would have had no conflict between the now rejected $40 limit and the parameter adjustment regulation.

M. Fuel Economy

The high-altitude standards could potentially affect the fuel economy of low-altitude vehicles, and high-altitude vehicles. With respect to low-altitude vehicles, EPA believes that these regulations will have no effect. The availability of exemptions for certain low-power vehicles will enable the manufacturers to market certain high fuel economy models at low altitude that possibly could not easily certify to the high-altitude standards, and thus could not easily obtain certificates of compliance even at low altitude. Alternatively, manufacturers of such vehicles might be forced to achieve compliance at high altitude by introducing a higher numeral axle ratio. However, if this axle is the only gear ratio offered with a particular model, it must be employed also on the vehicle's low-altitude counterpart, and this would make the low-altitude vehicle less fuel efficient. Of course, manufacturers could produce more than one complying axle and then sell only the most fuel efficient at low altitude to retain a higher Corporate Average Fuel Economy (CAFE) rating.

For high-altitude vehicles, in general, it appears that these regulations will have a beneficial effect on fuel economy. Manufacturers are expected to recalibrate many engines to compensate for the effects of high altitude on the combustion process. In particular, the fuel-air mixture for controlled engines will be leaner than for uncontrolled engines. Unfortunately, the very limited data which are available to EPA preclude a quantification of this potential benefit.

III. Public Participation

It is the purpose of this section of the Preamble to highlight those major areas of comment which resulted in significant alterations to the Proposed Rulemaking package as well as those which did not. The reader will be able to see from these paragraphs how the Final Rule differs from the NPRM and why EPA did not follow the suggestions of some commenters. The reader is encouraged to consult the separate document entitled "Summary and Analysis of Comments," which summarizes the comments received along with the comprehensive EPA staff analysis (see Availability of Documents below). All of the detailed documents are assembled in the public docket.

A. Standards

The automotive industry, principally through the Motor Vehicle Manufacturers' Association (MVMA), challenged EPA's proposed standards as violating the intent of Congress as expressed in section 202(f) of the Clean Air Act, as amended. That paragraph mandated that the interim (1982–83) high-altitude standards not require a percentage reduction greater than that implied by the low-altitude, light-duty vehicle (LDV) standards for the same year. The baseline or reference year was to be 1970; hence, a 90 percent reduction from the 1970 fleets of LDV and LDT (light-duty trucks) is the legal maximum.

The MVMA challenged that EPA's manipulation of the available data was not valid and led to an incorrect value for the estimated 1970 baseline. This low baseline would then lead to unacceptably stringent standards after a 90 percent reduction was taken. Although there is some merit to the alternative MVMA approach, EPA believes its approach better estimates the baseline. While both approaches are merely mathematical simplifications, MVMA's approach is less able to provide an explanation for the effect of altitude on emissions which is based upon physical grounds. Furthermore, adoption of the MVMA recommendations would lead to high-altitude standards that are totally ineffective for controlling LDT emissions. The MVMA standard for CO would result in a higher lifetime emission rate than that for current LDTs operating at high-altitude in the absence of these regulations, and the MVMA standard for HC would result in insignificant reduction for that pollutant.

The crux of the problem lies in the fact that no proper baseline of 1970 vehicles was obtained at high-altitude operation when the vehicles were new. "Proper" here refers to the use of the 1975 Federal Test procedure (FTP) now in use and upon which these interim standards rely. Obtaining the baseline a decade later requires considerable compromise inasmuch as the fleet now is worn and generally not available. MVMA ran a study of 25 1970 light-duty vehicles selected to represent the sales-weighted fleet for that year. After the vehicles were overhauled to the extent possible to return their engines, drivetrains, and, especially, their emissions control devices to original condition, tests were run at both low and high altitude.

A comparison between the MVMA low-altitude LDV results (2.85 g/mi HC and 20.45 g/mi CO) and the generally accepted low-altitude LDV baseline values for that year (4.1 g/mi HC and 34 g/mi CO) showed that the MVMA fleet would have produced anomalously low values for the high-altitude standards, thus, a correction to the MVMA high-altitude baseline was necessary. EPA, in the proposal, derived the estimated high-altitude baseline by adding the difference between the low and high-altitude results from MVMA to the generally accepted low-altitude LDV baseline values. MVMA's position was that the ratio of their high and low-altitude results should have been multiplied by the generally accepted low-altitude LDV baseline. EPA's principal rationale is that due to the linearity between the mixture ratio and emissions on the rich side of stoichiometric mixture, the effect of a change in altitude, which will change the mixture ratio, will yield an additive effect on the emissions. For the above

mentioned reasons, EPA has made no revisions to the high-altitude LDV standards.

MVMA also objected to EPA's derivation of the LDT standards. In the proposal, EPA derived the standards by using (1) data from a 1969 LDT baseline fleet which was tested at low altitude, and (2) the absolute difference in the emissions of the MVMA 1970 LDV baseline fleet when tested at both high and low altitudes. The NPRM stated that using data from these two sources could introduce some error into the derivation of the standard but reasoned that the potential errors would likely cancel one another to a large degree. MVMA correctly pointed out that this assumption was erroneous and argued that the equation used to derive the standards was inappropriate. After carefully considering the comments, EPA rejected the argument that the equation was inappropriate. However, because of errors in the data base, EPA reconsidered the overall derivation of the standards. In this analysis, it was found that the proposed standards, which are being promulgated in this rulemaking, are actually less stringent than those allowed by section 202(f). Unfortunately, while the Act apparently permits these more stringent standards, to use them at this point could require additional analysis and possibly a reproposal which would delay the truck standards, at least to 1983. EPA judges that it would be preferable from an air quality perspective to promulgate the standards as proposed, thereby obtaining some control, although not the maximum, in 1982.

Finally, the industry correctly observed that EPA had not proposed waiver standards for CO and NOx to correspond to the low-altitude waiver standards. Failure to do so may contravene section 202(f). Thus, in response to the comments, EPA is promulgating waiver standards. These standards were derived by a method which is comparable to that used in finding the non-waivered LDV and LDT high-altitude standards.

B. Technical Feasibility

Many manufacturers commented that the proposed standards were infeasible for the 1982 model year LDVs or LDTs. Only a few commenters argued that the standards were infeasible for 1983 model year vehicles. In analyzing these comments, EPA found that many manufacturers failed to provide relevant test data with which to justify their claims of technical infeasibility. Nevertheless, depite the limitations imposed by the lack of substantive comments, EPA's technical staff performed a comprehensive feasibility analysis for all the manufacturers that commented on this issue.[4] The analysis utilized all the information presently available to EPA including 1981 certification data, CO waiver applications, oral testimony and written comments on the proposal, and the technical literature. Using this information, EPA finds that no evidence exists which proves any of the high-altitute standards are technically infeasible for LDVs and LDTs. On the contrary, in the cases where sufficient data was available with which to draw definite conclusions, the standards were indeed feasible. Anyone wishing further detail should consult the above referenced report.

C. Adequacy of Existing High-Altitude Test Facilities

EPA received comments which, in general, claimed that the amount of existing test capacity at high altitude was inadequate for implementation of this rule in 1982. It was claimed that the two commercial testing facilities at high altitude could not handle all of the necessary devlopment work that manufacturers without high-altitude testing facilities would require. However, no analysis of the alleged facilities shortage was attempted by any commenter.

As a result of these comments, EPA solicited additional information from the manufacturers and from the two high-altitude commercial facilities. EPA asked the companies if they had a test facility located anywhere at high altitude, and, if so, how many chassis dynamometers and Sealed Housings for Evaporative Determination (SHEDs) the facility had. Also, they were asked if they had any environmental chambers capable of simulating high-altitude conditions and, if so, what equipment did it have. EPA obtained a quick but comprehensive survey of the existing high-altitude facilities in this manner. The manfacuturers and the commercial labs were very cooperative. From this survey the Agency was able to estimate the total capacity for high-altitude testing.

Next, EPA needed to know the number of high-altitude tests required to implement this regulation. The Agency separated testing requirements into four groups: (1) Development, (2) Certification, (3) Selective Enforcement Auditing (SEA), and (4) In-Use Surveillance. As EPA analyzed each testing need it soon became apparent that the only one which would make significant demands on test facility capacity would be development. The summation of the other three areas of testing is less than 10 percent of the development testing needs.

In order to assess the industry's development testing needs, EPA had to estimate the emission control technologies that would be used to meet the high-altitude standards and then estimate the number of development tests each technology would require. The emission control technologies which EPA expects each manufacturer will utilize are based on the manufacturers' comments and on the Agency's analysis of existing data (see Summary and Analysis of Comments in docket, technical feasibility issue). The number of development tests per engine family was estimated using manufacturers' comments, and EPA's own in-house development expertise.

Once the number of development tests was determined for each manufacturer, the manufacturer's testing capability was compared to that number of development tests. If the manufacturer's testing capacity was inadequate to handle the estimated number of development tests, then it was assumed that the excess number of tests would be at the commercial facilities in Denver. When all of the manufacturers' excess development tests were summed and compared to the existing high-altitude test capacity of about 60 percent was determined. Thus, EPA concluded that not only are existing high-altitude test facilities adequate for 1982 implementation of this rule, but the safety margin is relatively comfortable. Even with the addition of certification testing, SEA testing and In-Use Surveillance testing to development testing, the excess capacity for high-altitude testing at the two commercial labs should be greater than 50 percent.

D. Selective Enforcement Auditing

The Selective Enforcement Auditing (SEA) regulations found as Subpart G, Part 86 of Title 40 of the Code of Federal Regulations will apply to these final high-altitude regulations. Comments on the relationship of SEA and these regulations were received and are separated into seven major subissues: (1) Adequacy of Proposal, (2) Facilities, (3) Impact on Foreign Manufacturers, (4) Available Vehicles, (5) Sanctions and, (6) Alternative Test Procedures. Each of these subissues is discussed below.

1. *Adequacy of Proposal.* Commenters on this subissue claimed that EPA had failed to propose a clear and responsible regulatory system for high-altitude SEAs. They requested that EPA

[4] "Technical Feasibility of the Proposed 1982–1983 High-Altitude Standards for LDVs and LDTs," EPA Report Number CTAB/TA/80–3, August, 1980.

repropose high-altitude SEA only after the specific requirements and a specific need were determined.

The SEA regulations are structured to accommodate new light-duty vehicle and light-duty truck standards within the existing SEA program. The special high-altitude testing situations and problems anticipated by EPA and the manufacturers can be handled by the flexibility contained in the existing SEA regulations.

EPA's experience with SEA indicates that compliance with a standard by a prototype certification vehicle does not necessarily mean that the manufacturer's production vehicles will also meet the standards. EPA sees no reason that this will be different for these new high-altitude regulations. After reviewing the SEA regulations, EPA has concluded that reproposal is not required and, thus, this final rulemaking includes high-altitude SEA.

2. *Facilities.* Some commenters expressed concern that, due to the limited number (two) of high-altitude commercial testing facilities in the U.S., the manufacturers would not be able to conduct SEA testing within the time constraints imposed by the SEA regulations. EPA's analysis of available commercial testing facilities indicates that the testing capacity should be many times that required for an SEA (see Summary and Analysis of Comments in docket). Furthermore, the Agency may exercise its authority under section 86.608(g) to give the manufacturer more time if he is experiencing scheduling difficulties. Therefore, EPA has determined that availability of facilities should not be a problem in conducting a high-altitude SEA.

3. *Impact on Foreign Manufacturers.* Several foreign manufacturers were concerned that their high-altitude SEA testing would have to be done in the U.S., thereby increasing the cost due to shipping charges. The SEA regulations address this point. Manufacturers must provide the personnel and equipment (facilities) needed to conduct SEA testing but such personnel and equipment does not have to be in the U.S. If a foreign manufacturer has access to a high-altitude testing facility in its own country, EPA will have the option to conduct any high-altitude SEAs at that facility. If a foreign manufacturer does not have a facility at home or simply wishes to conduct an SEA in Denver instead, then the costs to ship the vehicles should be a minimal extra cost since the vehicles would have been shipped anyway and probably to a location fairly close to Denver.

4. *Available Vehicles.* Commenters were generally concerned that if EPA were to pick a vehicle configuration of low sales volume, then it could be very difficult to secure enough of these vehicles for a high-altitude SEA. EPA is aware that some vehicle configurations have very low sales at high altitude. However, different sampling plans available in the SEA regulation could allow as few as four (4) vehicles to be tested in an SEA. Furthermore, this final rule requires that all vehicles (unless exempted) be capable of being modified (if necessary) to meet both high- and low-altitude standards; therefore, low-altitude versions of the selected configuration could be modified to supply the high-altitude versions needed for an SEA. New sampling plans under consideration by the Agency would further reduce the possibility of any problems with obtaining low sales volume vehicles.

5. *Sanctions.* One commenter stated that EPA lacks authority to suspend or revoke certification based upon testing at any altitude other than the altitude at which the vehicles in question are principally operated. This final rule provides that one certificate of conformity be issued to cover both high- and low-altitude versions of an engine family. If a manufacturer's certificate is revoked, then both high- and low-altitude vehicles would be illegal to sell. The commenter did not provide a basis for the statement that EPA lacked such authority.

EPA has promulgated regulations under authority of sections 202(a) and 202(f) of the Clean Air Act. These high-altitude regulations require that a vehicle (unless exempted) be capable of meeting both high- and low-altitude standards. If a vehicle is found not to meet either standard, it is in noncompliance and the certificate can be revoked.

6. *Alternative Test Procedures.* Several commenters requested that some alternative testing procedure be employed for high-altitude SEA. The SEA regulations (section 86.608(a)), however, require that SEA vehicles be tested according to the Federal Test Procedure (FTP). Alternate test procedures for both high-altitude certification and SEA have been rejected. These test procedures are discussed more fully below.

E. High-Altitude Certification .

EPA received a substantial number of comments concerning various aspects of the proposed high-altitude certification scheme. These comments were separated into four major subissues: (1) Alternative Certification Test Procedures, (2) Number of Certification Vehicles, (3) Testing in Foreign Countries and, (4) Federal Test Procedure (FTP) Driving Cycle Change. Each subissue is discussed below.

1. *Alternative Certification Test Procedures.* The commenters requested that EPA adopt some alternative test procedure rather than requiring the full FTP to show compliance with the high-altitude standards. The commenters suggested that the California Air Resources Board's (CARB) high-altitude certification scheme would be appropriate for a Federal high-altitude emission control program. One commenter claimed that the CARB procedures have "already been found to meet the needs of high-altitude population centers" while another claimed that the California procedures are "an effective means of reducing high-altitude emissions." However, neither commenter included any analysis or supportive data to substantiate its claim. Industry support for the alternative certification scheme is founded on the economic relief that accrues because of the reduced certification and development costs.

The CARB certification scheme basically attempts to ensure that, at high altitudes, the amount of oxygen in the vehicle exhaust is sufficient to combust the unburned fuel in the exhaust. The CARB procedure consists of three choices which the manufacturer can employ to show a lean mixture at the tailpipe: flow bench testing, analytical calculations, and dynamometer testing.

While EPA agrees with the commenters that the CARB procedures would probably reduce hydrocarbon (HC) and carbon monoxide (CO) emissions to some extent as compared to no certification scheme at all, the Agency is confident that the reductions would be substantially less than those obtained under EPA's certification test procedure. The CARB procedures seek only to assure that the *potential* exists for the unburned fuel to be oxidized and this potential is only ensured over a few selected driving modes (i.e., idle, cruise, and wide-open throttle). Whether or not the unburned fuel is actually oxidized before being emitted to the atmosphere is unknown. Also, driving modes which are known to cause major proportions of total emissions (i.e., coldstart and transient operation) are not even considered.

Although this Final Rule is cost effective as compared to other HC and CO control strategies, there are two other important reasons why EPA's certification program is preferred. First, under EPA's program, in-use emissions can be approximated for future air quality planning. CARB's program makes no attempt to define the amount

of emissions that are actually reaching the atmosphere. An extensive in-use surveillance program would be required to determine at what level high-altitude vehicles are emitting pollutants. The variation among different manufacturer's vehicles as well as the variation among different models of the same manufacturer would be quite large, necessitating an extensive and costly in-use surveillance program to define emission levels. Under this Final Rule, actual in-use emissions can be estimated because certification testing provides data on the level of emissions being produced. From these estimates of in-use emissions, benefits have been calculated and necessary air quality planning can be accomplished.

Second, use of the FTP is necessary to implement effectively section 207(b) warranty regulations. In section 207(b) of the Clean Air Act, as amended, Congress authorized EPA to establish regulations which would require manufacturer liability for improperly functioning emission control systems. These warranty regulations rely on Inspection and Maintenance short tests which are correlated to the FTP and the appropriate standard. Since the CARB certification scheme would have, in practicality, precluded a high-altitude standard, section 207(b) warranty protection would have been denied to high-altitude consumers. This would be unfair and unacceptable in light of the fact that low-altitude consumers will soon have this protection.

2. *Number of Certification Vehicles.* The manufacturers were generally concerned that, as proposed, the regulation would allow EPA to select for certification testing under high-altitude conditions more emission-data vehicles than allowed for low-altitude certification testing. The manufacturers claimed that since only a small percentage (4 percent) of national sales occur at high altitude, the high-altitude certification program was overly burdensome compared to the low-altitude certification program.

EPA agrees that the high-altitude certification burden should be less than at low altitude. In the proposal EPA emphasized that, in fact, emission-data vehicle selection for high-altitude certification testing would be substantially less than the maximum allowed under the proposed regulation. However, after further analysis, EPA has concluded that a change in the final regulation is appropriate. The Agency has determined that the allowance of only one high-altitude, emission-data vehicle selection per engine family, in concert with Selective Enforcement Auditing, will provide sufficient assurance to EPA that the engine family is in compliance with the new high-altitude standards. Additionally, this change to the proposal will decrease expected certification costs by approximately 67 percent.

3. *Testing in Foreign Countries.* A couple of foreign manufacturers questioned whether they would be permitted to conduct certification testing in their own countries or they would be required to do certification testing in the United States. Under EPA's current low-altitude certification program manufacturers can do certification testing anywhere they wish. These high-altitude regulations are the same as the low-altitude regulations on this point. Foreign manufacturers can conduct tests in their country and then send the results to EPA.

4. *FTP Driving Cycle Change.* Comments received on this subissue claimed that the driving cycle used for high-altitude certification testing should be changed to reflect the different performance characteristics of vehicles at high altitude as compared to low altitudes. The commenters claimed that since acceleration is generally poorer at high altitude the acceleration rates contained in the FTP driving cycle should be reduced. Furthermore, they stated that unless the acceleration rates were reduced, the vehicles would operate at wide-open throttle too much of the time thereby making it more difficult to meet the high-altitude standards.

EPA agrees with the commenters that vehicle acceleration is, indeed, adversely affected at high altitudes. However, the appropriate driving cycle will not attempt to reflect the performance characteristics of a vehicle. Rather, the appropriate driving cycle will attempt to simulate the "typical trip" taken by the "typical driver." EPA has no reason to believe (nor did any commenter address this point) that the "typical trip" and the "typical driver" at high altitudes differ from those at low altitudes. In other words, although the demands placed on the vehicle may be somewhat more under high-altitude conditions because acceleration rates are less, the high-altitude driver still attempts to get from point "A" to point "B" in the same amount of time as the low-altitude driver. It may be true that the high-altitude vehicle is in wide-open-throttle more of the time but this is an accurate reflection of high-altitude driving conditions. Therefore, EPA has determined that the driving cycle currently in use at low altitude is also correct for high altitude.

F. Economic Impact

The majority of commenters on this issue stated that EPA had significantly underestimated the cost of the proposal. Unfortunately, in almost every case, the comments on the cost of the high-altitude regulation were general and provided no breakdown of the associated cost elements or other supporting detail. This lack of substance and, hence, justification, prevents EPA from effectively analyzing the manufacturers' technology cost comments in detail.

In addition to the general and unsupported nature of many of the manufacturers' comments, EPA's technology analysis found that some estimates appeared to be very pessimistic and could not be used to characterize realistically the costs of this regulation. The comments, however, were very helpful in characterizing the emission control technology which will be required to comply with the standards. EPA used this information to develop a more accurate economic analysis than was possible in the proposal.

The aggregate cost estimate for these regulations has increased significantly from the NPRM. Primarily, the Agency's previous estimate of the most likely control hardware, which was based on discussions with industry representatives, was essentially correct with two exceptions. First, the complexity of the changes which may be required by some feedback systems was in error. Second, Ford Motor Company reversed its earlier commitment to feedback systems on its LDV's in favor of nonfeedback systems. Controlling high-altitude emissions with nonfeedback systems is usually more expensive than with feedback systems. Another reason the costs changed from the NPRM is that EPA had underestimated the development effort which will be required to recalibrate engine operating parameters for good emissions performance at higher elevations. EPA's revised economic analysis paid particularly close attention to the required feedback changes and development effort. Therefore, the more accurate estimate of control technology costs was made possible, in part, by the comments to the proposal.

G. Environmental Impact

All automobile manufacturers commented that the interim standards are unjustified and will not result in any significant improvement in air quality. Opposing this view were comments from political representatives and the

general public which stated that the standards were necessary to improve air quality and protect the public health. In response to specific statements by industry representatives, EPA performed a careful reevaluation of the existing air pollution data.

Many industry representatives pointed out that recent air quality trends up to 1977 have shown an improvement in pollution levels, and that because many new cars have the capability to compensate somewhat for altitude changes, this air quality improvement will continue without the standards. EPA is in agreement with the commenters, that CO levels have steadily declined in the period up to 1977. However, the trend has not continued after that date. CO levels in 1978 were higher than 1977, and were not significantly different than those in 1975 and 1976. EPA also is in general agreement with the commenters, that many new cars have the capability to compensate somewhat for altitude changes. This was acknowledged in the NPRM which went on to add that high-altitude standards are needed to assure that the electronic control systems are adequately designed for the full range of altitudes where emission reductions are required. Since there is no assurance that electronic systems are adequately designed or even to know how many cars will indeed have these systems, it is unwise to conclude that air quality will continue to improve in high-altitude areas because of these systems.

Nevertheless, the justification for the interim high-altitude standard is not based on whether beneficial air quality trends will or will not continue. The issue is if the standards will help in the attainment and maintenance to the National Ambient Air Quality Standards (NAAQS). Unfortunately, even with the high-altitude standards, attainment of the NAAQS is not assured.

Based on a photochemical dispersion model, the State of Colorado was not able to project attainment of the ozone standard by the statutory deadline of 1987, using Mobile I emission factors and an inspection and maintenance program (I/M). Colorado was able to predict attainment of the CO standard by 1987 using Mobile I and I/M. It must be noted, however, that the Mobile I emission factors used by Colorado are lower than those used in EPA's draft Regulatory Analysis. Mobile I was based on the assumption that 1980 and later model year vehicles would exhibit the same ratio of high- to low-altitude emissions as 1975 and 1976 model year vehicles. Data from prototype 1980 and 1981 control system vehicles were used in the Regulatory Analysis to update emission factors for 1980-83 model year vehicles without high-altitude standards. This analysis has since been revised in the final Regulatory Analysis to include new information. The new vehicle CO emission rates for 1979–83 LDVs and LDTs at high altitude have been increased in the revised analysis, so the disparity between the figures used by EPA and those previously used by Colorado appear to be significant. Furthermore, the Colorado I/M program has been revised by the Colorado Legislature and may not provide as much emission reduction by 1987 as was assumed when attainment of the CO standard was demonstrated. Therefore, attainment of the CO standard is not a certainty.

One commenter correctly pointed out that the high-altitude standard may result in leaning the motor vehicle's fuel-air mixture which could result in greater NO_x emissions. Since NO_2 is a catalyst for photochemical smog, any increase in NO_x could lead to a more severe ozone problem.

In analyzing this comment, EPA found that even though high-altitude emissions of NO_x for 1982 and 1983 vehicles may increase slightly over what they would be without standards, the high-altitude NO_x standard is much lower than high-altitude NO_x levels for any model year prior to 1981. Thus, ambient NO_2 levels will continue to decline with the interim high-altitude standards. Furthermore, Denver is the only high-altitude area with high levels of NO_2. Denver only marginally exceeded the standard from 1975 to 1977, and in 1978 NO_2 levels were below the standard. Denver also has levels of ozone which exceed the national standards. Analyses of attaining the ozone standard by the State of Colorado and EPA indicate that reductions in HC emissions are more critical than reductions in NO_2. Therefore, EPA believes that these regulations will not significantly impact the ability of high-altitude regions to meet the NAAQS for ozone or NO_2.

Several changes from the proposal were made in the final environmental analysis. Some of these have already been described previously. First, the CO emission rates for 1979–1983 LDVs and LDTs have been increased. Second, the analysis has been revised to account for the higher usage of light-duty trucks in high-altitude areas. Third, Ford Motor Company stated at the public hearing that most of their vehicles would utilize non-feedback carburetors in model years 1982 and 1983. The analysis has been revised to account for this change in technology by Ford.

H. Leadtime

Manufacturers generally expressed concern that inadequate leadtime existed in which to develop the necessary control hardware either because of the hardware's complexity, or because adequate high-altitude test facilities are not available. In analyzing the issue of technical complexity, EPA found that the manufacturers' concern was often related to the possibility that long-leadtime tooling may be required. After reviewing the commenters' other statements regarding control hardware requirements and conducting an independent study, the Agency found that major tooling changes are not required to produce the requisite control hardware. Therefore, long-leadtime tooling is not a problem. It was also found that the requisite hardware is not "complex." EPA believes that the standards can be achieved in a timely manner with recalibrations of certain engine and emission control parameters. These recalibrations include carburetion changes for nonfeedback systems and electronic module changes for feedback systems. All recalibrations can be developed within the available time, utilizing the existing high-altitude test facilities. Hence, EPA has retained 1982 as the implementation date of these standards.

However, the lack of detail in the manufacturers' submittals casts some doubt on the accuracy with which EPA can predict the requisite leadtime in all cases. Coupled with the small interval of time now available for 1982 certification, this uncertainty leads EPA to be concerned that the manufacturers may not, in all cases, have sufficient time and resources to complete the certification process. In order to relieve this leadtime burden, this rule includes a special 1982 only exemption for 30 percent of each manufacturer's LDT fleet. These exempted vehicles can be sold at high altitude and, hence, the exemption does relieve the manufacturers of this burden.

I. Exemptions

EPA is promulgating this Final Rule with two new exemption provisions, while removing that which was proposed. The first exemption is based upon a vehicle having insufficient performance to be generally suitable for high-altitude use. This is the same general perspective as the exemption scheme in the proposed rule. However, instead of basing performance upon measured acceleration, the criterion shall be the values of certain design parameters upon which performance depends. These parameters are the engine displacement-to-weight ratio (D/

W) and the engine speed-to-vehicle speed ratio (N/V). The alternative, acceleration-based performance criterion that was proposed has been dropped as a result of manufacturers' comments.

In addition, and for an entirely different purpose, another exemption will be offered for light-duty trucks in 1982 only. This will be a blanket exemption of 30 percent of each manufacturer's projected high-altitude LDT sales and replaces the performance exemption. These vehicles will still be eligible for sale at high altitude.

The manufacturers unanimously supported the exemption idea, although for different reasons and, reflecting those reasons, they offered a variety of alternative criteria to circumscribe the exemptions. Their perceived need for exemptions in many cases was influenced by the question of whether they would be permitted by the certification rules to employ axle ratio changes as part of the high-altitude fix.

The variety of alternative criteria that were suggested included (1) exemption for vehicles having automatic compensating devices, (2) exemption for all vehicles having fixed calibration, (3) exemption for all high fuel economy vehicles, (4) exemption for poor performers as measured by actual performance or by certain design variables, and (5) exemption of a percentage of sales.

EPA reconsidered the exemption criterion in the light of the various proposals and with particular emphasis on the basic purpose of the exemption rule: to avoid the loss of fuel economic vehicles from the low-altitude market because those vehicles could not, without great difficulty, comply with the high-altitude rule. In addition, EPA considered the need for exemptions during the 1982 model year based upon leadtime.

EPA rejected schemes to exempt vehicles according to the control technology which they employed. Such schemes are self serving to particular manufacturers and do not directly address the goal. EPA considered the exemption criteria proposed by industry which addressed high fuel economy vehicles. While relevant to the goal, absolute, and unambiguous, the criterion would miss many vehicles which EPA has determined are in need of exemption on technical grounds; namely those vehicles of lower absolute fuel economy, but relatively high fuel economy for their size. Also, it is not high fuel economy *per se* which creates the technical problems for compliance, but rather poor performance arising largely from the attempt to improve the relative fuel economy of all vehicles, large and small. The poor performance arises from the use of smaller engines and results in excessive time in power enrichment and, hence, excessive emissions, especially at high altitude when available power is very small.

The logic leads directly to a consideration of the performance-based criteria such as that proposed by EPA. The principal defect with EPA's proposal, according to industry, is that it requires testing of vehicles for acceleration at altitude at a very late stage in the development cycle, thus creating severe leadtime problems should a vehicle unexpectedly not be eligible for exemption. Several manufacturers suggested the use of objective design parameters which are the governing variables which impact performance. These parameters are the displacement-to-weight ratio (D/W) and the engine speed-to-vehicle speed ratio (N/V).

Initially, EPA rejected such proposals because if the values were fixed, the consumers' changing perception of minimal acceptable performance (in response to growing fuel economy concerns) would lead to an ever-increasing fraction of the fleet being exempted. However, EPA has modified this concept to allow the criterion to change with the market. Each manufacturer will have, in a given model year, a range of combinations of D/W and N/V, the lower limit circumscribing a well-defined boundary of minimum performance which that manufacturer will judge to be sufficient to be marketable. This curve will then be mathematically shifted to a 16 percent higher displacement (D) to reflect the effect of high altitude (5300 feet). Vehicles of each manufacturer with N/V and D/W combinations that now fall on the unacceptable performance side of his own displaced curve will be eligible for exemption. This will be the basic exemption criterion.

N/V is, of course, dependent upon the transmission gear selected. Two possibilities are paramount: either the lowest numerical gear ratio which may be direct drive (1:1) or an overdrive, or, alternatively, direct drive exclusively (1:1). In the latter case, the presence of an overdrive, if any, is ignored. Substantial arguments support each choice. The motivation for this entire procedure is to identify those vehicles which may be expected to have inferior performance at high altitude. If the performance in question is low-speed acceleration typical of driving over the FTP, then the lower option (1:1) is perhaps more relevant; it also puts all vehicles on an equal footing. If, on the other hand, the performance of interest is acceleration at cruise, then the highest gear (1:1 or overdrive, if available) is more relevant. This performance may, indeed, be of primary interest to low-powered vehicles at high altitude which may find the power available at cruise to negotiate passing and minor road grade insufficient to maintain overdrive. Because EPA could not find a sufficient rationale to select one over the other, this final rule allows each manufacturer to select the basis for the determination of the gearing for N/V, 1:1 or the lowest numerical gear ratio.

A criterion based upon a percentage of sales was judged to miss the point of the purpose of exemptions for technical difficulty, although it would address the question of preservation of fuel economic vehicles at low altitude. However, in the context of exemptions because of inadequate leadtime, this criterion appears more logical. EPA determined in its review of comments on leadtime constraints, that manufacturers of trucks would have some difficulty completing for the 1982 model year, all the necessary calibration adjustments and subsequent certification activities. This would be especially true of the larger manufacturers which offer a diverse line of LDTs and which also must do parallel activities for their LDV lines. This may strain severely their resources in the short time available. Hence, an exemption of 30 percent of each manufacturer's projected high-altitude LDT sales would lighten the burden for 1982 considerably. These vehicles would still be eligible for sale at high altitude as, otherwise, the exemption penalizes the manufacturers. This exemption is offered in lieu of the performance exemption.

J. Model Availability

A number of responses to the NPRM claimed that the proposed $40 limit to modify any vehicle configuration to its high-altitude equivalent would reduce model availability rather than maximize it. This would occur because the infeasibility of holding to $40 would prevent certification altogether of some configurations. Others pointed out a failure to certify on either technical or business grounds would reduce availability at high *and* low altitude. These vehicles lost would likely be the most fuel economical.

In reviewing the manufacturers' statements of the technology base, EPA recognized that the control methods to be used were not as simple to employ as originally conceived. Also, certain carburetion controls, which were

assumed to be employed on both high- and low-altitude vehicles, would be, in fact, employed only on high-altitude vehicles. These and other factors made it apparent that the $40 modification limit would have to be abandoned. As originally conceived, however, the concept of requiring all vehicles to be modifiable at a modest cost would have maximized model availability because all vehicles would have had a high-altitude counterpart. In order to preserve some benefit from this concept, the final rule retains the requirement that each vehicle be modifiable to a high-altitude configuration (with certain exemptions) in order to obtain a certificate. However, the dollar limit on the modification cost is not included in this rulemaking. With a general knowledge of the technology involved and with the modifiable requirement in force, EPA has concluded that a satisfactory level of model availability will be acceptable although the cost per vehicle may exceed $40 if a low-altitude vehicle needs to be modified. The cost for the average vehicle originally manufactured in the high-altitude configuration will range from less than a dollar to $42, although individual vehicles could cost more (probably not more than $75), depending on the amortization arrangement. This will not significantly alter the consumer's perception of the choices of models available to him.

Also, some commenters pointed out that a failure to certify a vehicle on either technical or business grounds would reduce availability at high *and* low altitude. The vehicles lost would likely be the most fuel economical and, hence, may be of considerable concern to the consumer. EPA remains unconvinced that there is unequivocally an insurmountable technical problem for fuel economy vehicles in complying, but has nonetheless recognized the possibility that such low power-to-weight vehicles may tend to spend an inordinate time in the power enrichment mode at high altitude and may thus fail the test. EPA has resolved this problem primarily through its exemption provision for low performance vehicles, that is, those which would tend to have very low power-to-weight ratios. As discussed elsewhere in this preamble, such exempted vehicles need not comply with the high-altitude standards and may yet be sold at low altitude wherein the bulk of the market lies. High-altitude consumers would be denied these vehicles and thus, model availability to them is reduced. However, because these low performance vehicles are not well suited to high-altitude use because of the power degradation with altitude, interest in these vehicles should be considerably reduced.

The special 30 percent sales exemption for LDT in 1982 will improve model availability because without the exemption, some model lines may not have the opportunity to complete certification in a timely fashion. The exemption permits sales at high altitude so consumer options are maximized.

K. Legal Authority

The manufacturers challenged EPA's contention that this regulation could hold the manufacturers liable for the sale of improper (i.e., low altitude) vehicles at high altitude. They contended that such an action created a vicarious liability; i.e., the arm's length relationship between the manufacturer and the dealer precluded manufacturer responsibility for the dealer's action. Furthermore, section 207(h)(1) of the Act was cited as specifically imposing direct responsibility for the ultimate sale of a vehicle upon the dealer.

EPA's position is that section 203(a)(1) prohibits the manufacturer from selling or introducing into commerce, a vehicle that is not covered by a certificate of conformity. Section 206(a)(1) provides that a certificate of conformity shall be issued if the Administrator determines that the vehicle conforms to the emission standards prescribed under section 202. Because section 203(a)(1) prohibits the manufacturers from selling a vehicle without a certificate of conformity to the emission standards, sale of a vehicle which conforms only to low-altitude standards for principal use at a high altitude would violate 203(a)(1) because that vehicle would not retain its coverage under the applicable certificate of conformity, causing the manufacturer to violate section 203 (a)(1).

The standard dealer/manufacturer arrangement is a franchise type agreement under which the manufacture sells the vehicles to the dealer, who resells them to the ultimate consumer. The vehicle manufacturers asserted that because they do not sell vehicles to the ultimate consumer, they should not be held responsible for the improper sale of vehicles. Instead, they agreed that independent dealers should be responsible for their own actions. Section 203(a)(1) clearly makes the manufacturers responsible for prohibited acts which occur through their distributor agreements. In addition, section 203(a)(4)(A) prohibits the manufacturer from selling a vehicle which does not conform to section 207(a). Section 207(a) requires the manufacturer to warrant to the *ultimate* purchaser that the vehicle will conform to the applicable regulations under section 202.

Because section 203(a)(1) and section 203(a)(4)(A) place their prohibitions solely on the manufacturer, the manufacturer may shift the performance of the required acts to another party but the responsibility for the proper performance of the duty cannot be shifted. The requirement that a vehicle conform to standards creates a non-delegable duty. The doctrine of the non-delegable duty is usually applied only when violation of a duty can result in harm to an individual or the public. The public health concerns connected with air pollution certainly qualify.

One other point raised by the vehicle manufacturers is that section 207(h)(1) of the Clean Air Act requires the dealer to furnish the purchaser with a certificate stating that the vehicle conforms to the applicable regulations under section 202. While this section does place a duty onto the dealer, there is no reason why that should release the vehicle manufacturers of their duty to also certify the vehicles as required by Section 203. Regulations of this sort are not without precedent. The 1977 high-altitude regulations had a similar condition (section 85.177–30(a)(4)).

L. Labeling

EPA received comments on the general subject of the new labeling requirements contained in this final rule. The commenters had two major concerns: (1) the use of the phrase "unsafe at high altitude" and (2) the use of the phrase "vehicle was sold."

The proposal would have required that the manufacturer affix a label to all exempted, low-altitude vehicle configurations stating that the vehicle had insufficient power to operate safely at high altitudes. The commenters claimed that while the high-altitude performance of an exempted vehicle may, indeed, be less than the low-altitude performance, such high-altitude performance would not necessarily be unsafe. In fact, such a label would imply that the exempted, low-altitude vehicle should not even be driven *through* high-altitude areas such as on a cross country trip.

EPA agrees with the commenters that the labeling requirement for exempted, low-altitude vehicles should be changed for the final rule. Accordingly, these final regulations require that the manufacturer affix a label to all exempted, low-altitude vehicles that states the vehicle is unsuitable for high-altitude use because of its poor performance and because of its noncompliance with the high-altitude emission standards.

The NPRM required manufacturers to affix a label to all high-altitude vehicles stating that the vehicle was sold to the ultimate purchaser for use at high altitude. The commenters argued that the labeling criterion was illegal because a manufacturer cannot state that a vehicle was sold for any purpose since the vehicle is eventually sold by a dealership. This question of whether or not a manufacturer is liable for the ultimate sale of a vehicle is discussed in the issue titled EPA's Legal Authority in the Summary and Analysis of Comments for this rulemaking. In that discussion, EPA holds that the manufacturer is liable for the ultimate sale of the vehicle. Therefore, the proposed labeling requirement is legal and is retained in this Final Rule.

A change from the proposal occurred due to further analysis of the issue. EPA recognizes the possibility that a low-altitude vehicle may be modified at a dealership to the high-altitude version (or vice-versa). Therefore, EPA is requiring that if a dealer modifies a low-altitude version to the high-altitude, then that dealer must affix a label to the vehicle which states that the vehicle has been modified to the high-altitude version prior to sale to the ultimate purchaser.

M. Fuel Economy

In response to the Notice of Proposed Rulemaking, a few commenters argued that it would not be possible to modify certain high fuel economy vehicles to meet the proposed high-altitude standards. Others commented that to do so would require major modifications which could degrade fuel economy, and because of the proposed $40 maximum charge, such vehicles might be prohibited from being sold at both high and low altitudes.

EPA recognizes that there is a remote possibility that some high fuel economy vehicles might not be able to comply with the high-altitude standards, but these are generally the same low-power vehicles which will be eligible for exemption, and, in fact, are often not in high demand at high altitude due to performance limitations. Thus, EPA disagrees with those manufacturers which claimed that their corporate average fuel economy at high altitudes would be negatively impacted by these regulations.

With respect to the fuel economy of manufacturers' low-altitude fleets, the Agency believes that these regulations will have no effect. The availability of exemptions for certain low-power vehicles will enable the manufacturers to market certain high fuel economy vehicles at low altitude that possibly could not certify to the high-altitude standards. Furthermore, the revocation of the $40 maximum charge eliminates the possibility that a manufacturer would be prohibited from selling vehicles at low altitude because of an excess cost for high-altitude modifications.

In addition, a few comments (and almost no data) were received regarding the fuel economy effects of the control hardware is expected to be utilized to meet the high-altitude standards. In responding to these comments, EPA found that the basic parameter of interest with respect to altitude changes is the air/fuel ratio of the combustion chamber mixture. For each vehicle, the manufacturer identifies the optimum air/fuel ratio for optimization of emissions, fuel economy, driveability, performance, etc. As the altitude of the vehicle increases, and the atmospheric density decreases, less air will necessarily enter the combustion chamber. Unless compensated for, the engine will thus have a lower air/fuel ratio (a "richer mixture"). This condition will produce higher hydrocarbon and carbon monoxide emissions, and typically worse fuel economy.

Generally, the net result of the modifications which manufacturers are expected to adopt will be an increase in the air/fuel ratio (a "leaner mixture") to one that is as close to the optimized air/fuel ratio as possible. This would be expected to increase fuel economy. Spark timing, in addition, can have an important effect on fuel economy. At high altitudes, NO_x emissions are naturally lower, there exists the ability to advance the timing to reduce fuel consumption. However, due to an absence of data from the manufacturers, it is impossible to quantify this alleged benefit. It is impossible to support a claim that there is a fuel penalty.

Availability of Documents and the Public Docket

Materials relevant to this rulemaking have been assembled in Public Docket No. A-79-14, U.S. Environmental Protection Agency, Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street, S.W., Washington, DC 20460. Such materials as regulatory support documents, comments, hearing transcripts, correspondence, the Summary and Analysis of Comments, and the Regulatory Analysis may be obtained by anyone from the docket. As provided in 40 CFR Part 2, the Agency may charge a reasonable fee for copying services. Additionally, single copies of the Summary and Analysis of Comments and the Regulatory Analysis are available through the Director, Emission Control Technology Division, 2565 Plymouth Road, Ann Arbor, MI 48105.

Evaluation Plan

Because of the fixed two-year life span of the regulations proposed in this action, the Agency is not planning to review it subsequent to its ultimate promulgation. However, at the time when regulations pertaining to high-altitude emission standards for 1984 and subsequent model years are promulgated, the Agency will put forward a plan for the review of the efficacy of that rulemaking action, to be completed within five years after its promulgation.

Reporting and Recordkeeping Requirements

Under the EPA's new "sunset" policy for reporting requirements in regulations, the reporting requirements in this regulation will automatically expire five years from the date of promulgation, unless EPA takes affirmative action to extend them. However, these regulations will be replaced or substantially revised by 1984 in response to the statutory requirements of Section 206(f) of the Clean Air Act.

Regulatory Analysis

The Administrator has determined that this action is a "significant" regulation. The Agency has prepared a document entitled, "Final Regulatory Analysis: Environmental and Economic Impact Statement for the 1982 and 1983 Model Year High-Altitude Motor Vehicle Emission Standards," which satisfies the requirements for analyses called for by Executive Order 12044, and sections 202(f983) and 317 of the amended Clean Air Act. Anyone may review and reproduce this document in the EPA Central Docket Section. Copies are also available upon request from the Office of Mobile Source Air Pollution Control, Waterside Mall, 401 M Street, S.W., Washington, D.C. 20460

Dated: October 2, 1980

Douglas M. Costle,

Administrator.

1. The table of contents for Subpart A of Part 86 is amended by the addition of the following sections:

Subpart A—General Provisions for Emission Regulations for 1982 and Later Model Year New Light-Duty Vehicles, 1982 and Later Model Year New Light-Duty Trucks, and for 1982 and Later Model Year New Heavy-Duty Engines

* * * * *

Sec.

86.082-1 General applicability.

Sec.
86.082–2 Definitions.
86.082–8 Emission standards for 1982 and later model year light-duty vehicles.
86.082–9 Emission standards for 1982 and later model year light-duty trucks.
86.082–21 Application for certification.
86.082–24 Test vehicles and engines.
86.082–26 Mileage and service accumulation; emission measurements.
86.082–28 Compliance with emission standards.
86.082–30 Certification.
86.082–35 Labeling.
86.082–38 Maintenance instructions.
86.083–9 Emission standards for 1983 and later model year light-duty trucks.

* * * * *

2. A new § 86.082–1 is added. This section is identical to § 86.079–1 except that paragraph (c) is deleted.

§ 86.082–a General applicability.

(a) The provisions of this subpart apply to 1982 and later model year new gasoline-fueled and diesel light-duty vehicles, 1982 and later model year new gasoline-fueled and diesel light-duty trucks, and 1982 and later model year new gasoline-fueled and diesel heavy-duty engines.

(b) *Optional applicability.* A manufacturer may request to certify any heavy-duty vehicle 10,000 pounds GVWR or less as a light-duty truck: Heavy-duty vehicle provisions do not apply to such a vehicle.

3. A new § 86.082–2 is added and reads as follows:

§ 86.082–2 Definitions.

The definitions in § 86.080–2 remain effective, except that the definition of "high-altitude conditions" is superseded and the definition of "low-altitude conditions" is added.

"High-altitude conditions" means a test altitude of 1,620 meters (5,315 feet) plus or minus 100 meters (328 feet), or equivalent observed barometric test conditions of 83.3 ± 1 kilopascals.

"Low-altitude conditions" means a test altitude less than 549 meters (1,800 feet).

4 Section 86.082–8 is amended by revising paragraph (a)(1) and adding paragraphs (d), (e), (f), and (g).

§ 86.082–8 Emission standards for 1982 and later model year light-duty vehicles.

(a)(1) The standards set forth in paragraphs (a) through (c) of this section shall apply for vehicles sold for principal use at other than designated high-altitude locations. Exhaust emissions from 1982 and later model year light-duty vehicles shall not exceed:

* * * * *

(d)(1) Model year 1982 and later light-duty vehicles sold for principal use at a designated high-altitude location shall be capable of meeting the following exhaust emission standards when tested under high-altitude conditions.

(i) *Hydrocarbons.* 0.57 grams per vehicle mile (0.35 grams per vehicle kilometer).

(ii) *Carbon monoxide.* 7.8 grams per vehicle mile (4.8 grams per vehicle kilometer), except that carbon monoxide emissions from light-duty vehicles of the following 1982 model year engine families shall not exceed 11 grams per vehicles mile (6.8 grams per vehicle kilometer).

Manufacturer	Engine family
American Motors	258 CID.
Chrysler	1.7L
	3.7L
	5.2L–4V.
General Motors	2.8L/173 CID–2V
	3.8L/231 CID–2V.
Jaguar-Rover-Triumph	215 CID
	326 CID.
Toyota	88.6 CID.

(2) *Oxides of nitrogen.* The allowable levels of oxides of nitrogen from light-duty vehicles which are sold for principal use at designated high-altitude locations are the same as set forth in paragraph (a)(1)(iii) of this section.

(2) The standards set forth in paragraph (d)(1) of this section refer to the exhaust emitted over a driving schedule as set forth in Subpart B of this part and measured and calculated in accordance with those procedures.

(e)(1) Fuel evaporative emissions from 1982 and later model year gasoline-fueled light-duty vehicles sold for principal use at designated high-altitude locations shall not exceed 2.6s gram per test when tested under high-altitude conditions.

(2) The standard set forth in paragraph (e)(1) of this section refers to a composite sample of the fuel evaporative emissions collected under the conditions set forth in Subpart B of this part and measured in accordance with those procedures.

(f) No crankcase emissions shall be discharged into the ambient atmosphere from any 1982 and later model year gasoline-fueled light-duty vehicles sold for principal use at designated high-altitude locations.

(g)(1) All light-duty vehicles shall be capable (by initial design, adjustment, or modification) of meeting the applicable emission standards set forth in this section for any altitude of operation. Such adjustments and modifications shall:

(i) Be capable of being effectively performed by commercial repair facilities.

(ii) All adjustments and modifications recommended by the manufacturer to be performed on vehicles to satisfy this requirement must be included in the manufacturer's application for certification, and be approved in advance by EPA in accordance with § 86.079–22.

(2) Exemptions for vehicles from the high-altitude emissions standards as set forth in paragraph (d) of this section may be granted by the Administrator for vehicles that are expected to have unsatisfactory performance under high-altitude conditions. Such exemptions will be granted upon petition by the manufacturers that the vehicle falls within the definition of vehicles eligible for exemption. A vehicle shall be considered eligible for exemption if its design parameters [displacement-to-weight ratio (D/W) and engine speed-to-vehicle speed (N/V)] simultaneously fall within the exempted range for that manufacturer for that year. The exempted range is determined according to the following procedure:

(i) The manufacturer shall graphically display the D/W and N/V data of all vehicle configurations it will offer for the model year in question. The axis of the abscissa shall be D/W (where (D) is the engine displacement expressed in cubic centimeters and (W) is the equivalent vehicle test weight expressed in pounds), and the axis of the ordinate shall be
N/V (where (N) is the crankshaft speed expressed in revolutions per minute and (V) is the vehicle speed expressed in miles per hour). At the manufacturer's option, either the 1:1 transmission gear ratio or the lowest numerical gear ratio available in the transmission will be used to determine N/V. The gear selection must be the same for all N/V data points on the manufacturer's graph. For each transmission/axle ratio combination, only the lowest N/V value shall be used in the graphical display.

(ii) The product line is then defined by the equation, $N/V = C(D/W)^{-0.9}$, where the constant, (C), is determined by the requirement that all the vehicle data points either fall on the line or lie to the upper right of the line as displayed on the graphs.

(iii) The exemption line is then defined by the equation, $N/V = C(0.84\ D/W)^{-0.9}$, where the constant, (C), is the same as that found in paragraph (g)(2)(ii) of this section.

(iv) The exempted range includes all values of N/V and D/W which simultaneously fall to the lower left of the exemption line as drawn on the graph.

(3) The sale of a vehicle for principal use at a designated high-altitude

location that has been exempted as set forth in paragraph (g)(2) of this section will be considered a violation of § 203(a)(1) of the Clean Air Act.

5. Section 86.082–9 is amended by revising paragraph (a)(1) and adding paragraphs (d), (e), (f), and (g).

§ 86.082–9 Emission standards for 1982 and later model year light-duty trucks.

(a)(1) The standards set forth in paragraphs (a) through (c) of this section shall apply for trucks sold for principle use at other than a designated high-altitude location. Exhaust emissions from 1982 and later model year light-duty trucks shall not exceed:

* * * * *

(d)(1) Model year 1982 and later light-duty trucks sold for principal use at a designated high-altitude location shall be capable of meeting the following exhaust emission standards when tested under high-altitude conditions.

(i) *Hydrocarbons.* 2.0 grams per vehicle mile (1.24 grams per vehicle kilometer);

(ii) *Carbon monoxide.* 26 grams per vehicle mile (16.2 grams per vehicle kilometer);

(iii) *Oxides of nitrogen.* 2.3 grams per vehicle mile (1.43 grams per vehicle kilometer).

(2) The standards set forth in paragraph (d)(1) of this section refer to the exhaust emitted over a driving schedule as set forth in Subpart B of this part and measured and calculated in accordance with those procedures.

(e)(1) Fuel evaporative emissions from 1982 and later model year gasoline-fueled light-duty trucks sold for principal use at a designated high-altitude location shall not exceed 2.6 grams per test when tested under high-altitude conditions.

(2) The standard set forth in paragraph (e)(1) of this section refers to a composite sample of the fuel evaporative emissions collected under the conditions set forth in Subpart B of this part and measured in accordance with those procedures.

(f) No crankcase emissions shall be discharged into the ambient atmosphere from any 1982 and later model year gasoline-fueled light-duty trucks sold for principal use at a designated high-altitude location.

(g)(1) All light-duty trucks shall be capable (by initial design, adjustment, or modification) of meeting the applicable emission standards set forth in this section for any altitude of operation. Such adjustments and modifications shall:

(i) Be capable of being effectively performed by commerical repair facilities.

(ii) All adjustments and modifications recommended by the manufacturer to be performed on vehicles to satisfy this requirement must be included in the manufacturer's application for certification, and be approved in advance by EPA in accordance with § 86.079–22.

(2) Exemptions for 1982 model year trucks from the high-altitude emission standards as set forth in paragraph (d) of this section may be granted by the Administrator upon petition by the manufacturer. No specific justification for the exemption need be included in the petition, but certain restrictions apply:

(i) Exemptions may be granted for up to 30 percent of the manufacturer's total projected LDT sales at high altitude for the 1982 model year.

(ii) Exemptions may be granted only for entire engine familes until the limit set forth in paragraph (g)(2)(i) of this section has been attained.

(3) The sale of a vehicle for principal use at a designated high-altitude location that has been exempted as set forth in paragraph (g)(2)(i)(A) and (B) of this section will *not* be considered a violation of § 203(a)(1) of the Clean Air Act.

6. A new § 86.082–21 is added. This section is identical to § 86.081–21 except for paragraphs (a), (b)(2), (b)(5)(i) and (b)(5)(ii).

§ 86.082–21 Application for certification.

(a) A separate application for a certificate of conformity shall be made for each set of standards (except for high-altitude standards) and each class of new motor vehicle engines. Such application shall be made to the Administrator by the manufacturer and shall be updated and corrected by amendment.

(b) The application shall be in writing, signed by an authorized representative of the manufacturer, and shall include the following:

(1)(i) *All vehicles and engines.* Identification and description of the vehicles (or engines) covered by the application and a description of their engine (vehicles only), emission control system and fuel system components. This shall include a detailed description of each auxiliary emission control device (AECD) to be installed in or on any certification test vehicle (or certification test engine).

(ii) *Light-duty vehicles and light-duty trucks.* (A) The manufacturer shall provide to the administrator in the preliminary application for certification:

(*1*) A list of those parameters which are physically capable of being adjusted (including those adjustable parameters for which access is difficult) and that, if adjusted to settings other than the manufacturer's recommended setting, may affect emissions;

(*2*) A specification of the manufacturer's intended physically adjustable range of each such parameter, and the production tolerances of the limits or stops used to establish the physically adjustable range;

(*3*) A description of the limits or stops used to establish the manufacturer's intended physically adjustable range of each adjustable parameter, or any other means used to inhibit adjustment;

(*4*) The nominal or recommended setting, and the associated production tolerances, for each such paramater.

(B) The manufactuer may provide, in the preliminary application for certification, information relating to why certain parameters are not expected to be adjusted in actual use and to why the physical limits or stops used to establish the physically adjustable range of each parameter, or any other means used to inhibit adjustment, are expected to be effective in preventing adjustment of parameters on in-use vehicles to settings outside the manufacturer's intended physically adjustable ranges. This may include results of any tests to determine the difficulty of gaining access to an adjustment or exceeding a limit as intended or recommended by the manufacturer.

(C) The Administrator may require to be provided detailed drawings and descriptions of the various emission related components, and/or hardware samples of such components, for the purpose of making his determination of which vehicle or engine parameters will be subject to adjustment for new certification and Selective Enforcement Audit testing and of the physically adjustable range for each such vehicle or engine parameter.

(2) Projected U.S. sales data sufficient to enable the Administrator to select a test fleet representative of the vehicles (or engines) for which certification is requested. The sales data shall also include the altitude of intended sale for light-duty vehicles and light-duty trucks.

(3) A description of the test equipment and fuel proposed to be used.

(4)(i) A description of the proposed mileage (or service) accumulation procedure for durability testing.

(ii) A description of the test procedures to be used to establish the evaporative emission deterioration factors required to be determined and supplied in § 86.079–23(a)(2).

(5)(i) A statement of recommended maintenance and procedures necessary to assure that the vehicles (or engines)

covered by a certificate of conformity in operation conform to the regulations, and a description of the program for training of personnel for such maintenance, and the equipment required.

(ii) A description of vehicle adjustments or modifications necessary, if any, to assure that light-duty vehicles and light-duty trucks covered by a certificate of conformity, conform to the regulations while being operated at any altitude locations, and a statement of the altitude at which the adjustments or modifications apply.

(6) At the option of the manufacturer, the proposed composition of the emission-data test fleet or (where applicable) the durability-data test fleet.

(c) Complete copies of the application and of any amendments thereto, and all notifications under §§ 86.079–32, 86.079–33, and 86.079–34 shall be submitted in such multiple copies as the Administrator may require.

(d) Incomplete light-duty trucks shall have a maximum completed curb weight and maximum completed frontal area specified by the manufacturer.

7. A new § 86.082–24 is added. This section is identical to section 86.081–24 except for paragraphs (b)(1)(v), (b)(1)(vi), and (b)(1)(vii)(D).

§ 86.082–24 Test vehicles and engines.

(a)(1) The vehicles or engines covered by an application for certification will be divided into groupings of engines which are expected to have similar emission characteristics throughout their useful life. Each group of engines with similar emission characteristics shall be defined as a separate engine family.

(2) To be classed in the same engine family, engines must be identical in all the following respects:

(i) The cylinder bore center-to-center dimensions.

(ii) The dimension from the centerline of the crankshaft to the centerline of the camshaft.

(iii) The dimension from the centerline of the crankshaft to the top of the cylinder block head face.

(iv) The cylinder block configuration (air cooled or water cooled; L–6, 90° V–8, etc.).

(v) The location of intake and exhaust valves (or ports) and the valve (or port) sizes (within a ⅛-inch range on the valve head diameter or within 10 percent on the port area).

(vi) The method of air aspiration.

(vii) The combustion cycle.

(viii) Catalytic converter characteristics.

(ix) Thermal reactor characteristics.

(x) Type of air inlet cooler (e.g., intercoolers and aftercoolers) for diesel-duty engines.

(3) Engines indentical in all the respects listed in paragraph (a)(2) of this section may be further divided into different engine families if the Administrator determines that they may be expected to have different emission characteristics. This determination will be based upon a consideration of the following features of each engine:

(i) The bore and stroke.

(ii) The surface-to-volume ratio of the nominally dimensioned cylinder at the top dead center positions.

(iii) The intake manifold induction port size and configuration.

(iv) The exhaust manifold port size and configuration.

(v) The intake and exhaust valve sizes.

(vi) The fuel system.

(vii) The camshaft timing and ignition or injection timing characteristics.

(4) Where engines are of a type which cannot be divided into engine families based upon the criteria listed in paragraphs (a)(2) and (a)(3) of this section, the Administrator will establish families for those engines base upon those features most related to their emission characteristics.

(5) The gasoline-fueled vehicles covered by an application for certification will be divided into groupings which are expected to have similar evaporative emission characteristics throughout their useful life. Each group of vehicles with similar evaporative emission characteristics shall be defined as a separate evaporative emission family.

(6) To be classed in the same evaporative emission family, vehicles must be similar with respect to:

(i) Type of vapor storage device (e.g., canister air cleaner, crankcase).

(ii) Basic canister design.

(iii) Fuel system.

(7) Where vehicles are of a type which cannot be divided into evaporative emission families based on the criteria listed above, the Administrator will establish families for those vehicles based upon the features most related to their evaporative emission characteristics.

(8) If the manufacturer elects to participate in the Alternative Durability Program, the engine families covered by an application for certification shall be grouped based upon similar engine design and emission control system characteristics. Each of these groups shall constitute a separate engine family group.

(9) To be classed in the same engine family group, engine families must contain engines identical in all of the following respects.

(i) The combustion cycle.

(ii) The cylinder block configuration (air-cooled or water-cooled; L–6, V–8, rotary, etc.).

(iii) Displacement (engines of different displacement within 50 cubic inches or 15 percent of the largest displacement and contained within a multidisplacement engine family will be included in the same engine family group).

(iv) Catalytic converter usage and basic type (non-catalyst, oxidation catalyst only, three-way catalyst equipped).

(10) Engine families identical in all respects listed in paragraph (a)(9) of this section may be further divided into different engine family groups if the Administrator determines that they are expected to have significantly different exhaust emission control system deterioration characteristics.

(b) Emission data:

(1) *Emission-data vehicles.* Paragraph (b)(1) of this section applies to light-duty vehicle and light-duty truck emission-data vehicles.

(i) Vehicles will be chosen to be operated and tested for emission data based upon the engine family groupings. Within each engine family, the requirements of this paragraph must be met.

(ii) Vehicles for each engine family will be divided into engine displacement-exhaust emission control system combinations as applicable. A projected sales volume will be established for each combination for the model year for which certification is sought. One vehicle of each combination will be selected in order of decreasing projected sales volume until 70 percent of the projected sales of a manufacturer's total production of vehicles of that engine family is represented, or until a maximum of four vehicles is selected. If any single combination represents over 70 percent, then two vehicles of that combination may be selected. The vehicle selected for each combination will be specified by the Administrator as to such features as engine code, transmission type, fuel system, and inertia weight class.

(iii) The Administrator may select a maximum of four additional vehicles within each engine family based upon features indicating that they may have the highest emission levels of the vehicles in that engine family. In selecting these vehicles, the Administrator will consider such features as the emission control system combination, induction system characteristics, fuel system, rated

horsepower, rated torque, compression ratio, inertia weight class, transmission options, and axle ratio.

(iv) If the vehicles selected in accordance with paragraphs (b)(1)(ii) and (iii) of this section do not represent each engine-system combination, then one vehicle of each engine-system combination not represented will be selected by the Administrator. The vehicle selected shall be of the engine displacement with the largest projected sales volume of vehicles with the control system combination in the engine family and will be designated by the Administrator as to such features as engine code, transmission type, fuel system, and inertia weight class.

(v) For each engine family, the manufacturer will select for testing under high-altitude conditions the one non-exempt vehicle previously selected under paragraphs (b)(1)(ii), (iii), or (iv) of this section which is expected to have the highest levels of exhaust emissions of vehicles in that engine family when operated at high altitude. In selecting these vehicles, the manufacturer will consider such features as the emission control system combination, induction system characteristics, ignition system characteristics, fuel system, rated horsepower, rated torque, compression ratio, inertia weight class, test weight, transmission options, and axle ratio.

(vi) [Reserved]

(vii)(A) Vehicles of each evaporative emission family will be divided into evaporative emission control systems. One vehicle of each evaporative emission control system within the evaporative emission family will be selected.

(B) The Administrator may select a maximum of four additional vehicles within each evaporative emission family based upon features indicating that they may have the highest evaporative emission levels of vehicles in that family.

(C) The Administrator may determine that the vehicles selected under paragraphs (b)(1)(ii) through (iv) of this section may be used to satisfy the requirements of paragraph (b)(1)(vii)(A) or (B) of this section.

(D) For each evaporative emission family, the manufacturer will select for testing under high-altitude conditions the one non-exempt vehicle previously selected under paragraphs (b)(1)(vii)(A), or (B) of this section which is expected to have the highest levels of evaporative emissions when operated at high altitude.

(E) Vehicles selected under paragraph (b)(1)(v) of this section may be used to satisfy the requirements of paragraph (b)(1)(vii)(D) of this section.

(2) *Gasoline-fueled heavy-duty emission-data engines.* Paragraph (b)(2) of this section applies to gasoline-fueled heavy-duty engines.

(i) Engines will be chosen to be run for emission data based upon engine family groupings. Within each engine family, the requirements of this paragraph must be met.

(ii) Engines of each engine family will be divided into engine displacement-exhaust emission control system combinations. A projected sales volume will be established for each combination for the applicable model year. One engine of each combination will be selected in order of decreasing projected sales volume until 70 percent of the projected sales of a manufacturer's total production of engines of that family is represented, or until a maximum of four engines is selected. The engines selected for each combination will be specified by the Administrator as to fuel system.

(iii) The Administrator may select a maximum of two additional engines within each engine family based upon features indicating that they may have the highest emission levels of the engines in that engine family. In selecting these engines, the Administrator will consider such features as the exhaust emission control system, induction system characteristics, ingition system characteristics, fuel system, rated horsepower, rated torque, and compression ratio.

(iv) If the engines selected in accordance with paragraph (b)(2)(ii) and (iii) of this section do not represent each engine displacement-exhaust emission control system combination, then one engine of each engine displacement-exhaust emission control system combination not represented shall be selected by the Administrator.

(3) *Diesel heavy-duty emission-data engines.* Paragraph (b)(3) of this section applies to diesel heavy-duty emission-data engines.

(i) Engines will be chosen to be run for emission data based upon engine family groupings. Within each engine family, the requirements of this paragraph must be met.

(ii) Engines of each engine family will be divided into groups based upon their exhaust emission control systems. One engine of each engine system combination shall be run for smoke emission data and gaseous emission data. Either the complete gaseous emission test or the complete smoke test may be conducted first. Within each combination, the engine that features the highest fuel feed per stroke, primarily at the speed of maximum rated torque and secondarily at rated speed, will usually be selected. If there are military engines with higher fuel rates than other engines in the same engine system combinations, then one military engine shall also be selected. The engine with the highest fuel feed per stroke will usually be selected.

(iii) The Administrator may select a maximum of one additional engine within each engine-system combination based upon features indicating that it may have the highest emission levels of the engines of that combination. In selecting this engine, the Administrator will consider such features as the injection system, fuel system, compression ratio, rated speed, rated horsepower, peak torque speed, and peak torque.

(c) Durability data:

(1) *Durability-data vehicles.* Paragraph (c)(1) of this section applies to light-duty vehicle and light-duty truck durability-data vehicles, except for the production durability-data vehicles selected for the Alternative Durability Program according to paragraph (h)(1) of this section.

(i) A durability-data vehicle will be selected by the Administrator to represent each engine-system combination. The vehicle selected shall be of the engine displacement with the largest projected sales volume of vehicles with that control-system combination in that engine family and will be designated by the Administrator as to transmission type, fuel system, inertia weight class, and test weight.

(ii) A manufactuer may elect to operate and test additional vehicles to represent any engine-system combination. The additional vehicles must be of the same engine displacement, transmission type, fuel system and inertia weight class as the vehicle selected for that engine-system combination in accordance with the provisions of paragraph (c)(1)(i) of this section. Notice of an intent to operate and test additional vehicles shall be given to the Administrator no later than 30 days following notification of the test fleet selection.

(2) *Gasoline-fueled heavy-duty durability-data engines.* Paragraph (c)(2) of this section applies to gasoline-fueled heavy-duty durability-data engines.

(i) A durability-data engine will be selected by the Administrator to represent each engine-system combination.

(ii) [Reserved]

(iii) A manufacturer may elect to operate and test additional engines to represent any engine-system combination. The additional engines must be of the same engine displacement and fuel system as the

engine selected for that combination in accordance with the provisions of paragraph (c)(2)(i) of this section. Notice of an intent to run additional engines shall be given to the Administrator no later than 30 days following notification of the test fleet selection. Deterioration factors calculated for each engine-system combination shall be applied separately to military and nonmilitary engines within the same engine-system combination.

(3) *Diesel heavy-duty durability-data engines.* Paragraph (c)(3) of this section applies to diesel heavy-duty durability-data engines.

(i) One engine from each engine-system combination shall be tested as prescribed in § 86.082–26(b)(6). At each test point, either the complete gaseous emission test or the complete smoke test may be conducted first. Within each combination, the engine which features the highest fuel feed per stroke, primarily at rated speed and secondarily at the speed of maximum rated torque, will usually be selected for durability testing. In the case where more than one engine in an engine-system combination has the highest fuel feed per stroke, the engine with the highest maximum rated horsepower will usually be selected for durability testing. If an engine-system combination includes both military and nonmilitary engines, then the nonmilitary engine with the highest maximum rated horsepower will usually be selected for durability testing.

(ii) A manufacturer may elect to operate and test additional engines to represent any engine-system combination. The additional engines must be of the same model and fuel system as the engine selected in accordance with the provisions of paragraph (c)(3)(i) of this section. Notice of intent to test additional engines shall be given to the Administrator no later than 30 days following notification of the test fleet selection. Deterioration factors calculated for each engine-system combination shall be applied separately to military and nonmilitary engines within the same engine-system combination.

(d) For purposes of testing under § 86.082–26(a)(9) or (b)(11), the Administrator may require additional emission-data vehicles (or emission-data engines) and durability-data vehicles (or durability-data engines) identical in all material respects to vehicles (or engines) selected in accordance with paragraphs (b) and (c) of this section, *provided* that the number of vehicles selected shall not increase the size of either the emission-data fleet or the durability-data fleet by more than 20 percent or one vehicle, whichever is greater.

(e) Any manufacturer whose projected sales for the model year in which certification is sought is less than:

(1) 2000 gasoline-fueled light-duty vehicles, or

(2) 2000 diesel light-duty vehicles, or

(3) 2000 gasoline-fueled light-duty trucks or

(4) 2000 diesel light-duty trucks, or

(5) 2000 gasoline fueled heavy-duty engines, or

(6) 2000 diesel heavy-duty engines, may request a reduction in the number of test vehicles (or engines) determined in accordance with the foregoing provisions of this section. The Administrator may agree to such lesser number as he determines would meet the objectives of this procedure.

(f) In lieu of testing an emission-data or durability-data vehicle (or engine) selected under paragraph (b) or (c) of this section, and submitting data therefor, a manufacturer may, with the prior written approval of the Administrator, submit exhaust emission data and/or fuel evaporative emission data, as applicable on a similar vehicle (or engine) for which certification has previously been obtained or for which all applicable data required under § 86.078–23 has previously been submitted.

(g)(1) This paragraph applies to light-duty vehicles and light-duty trucks, but does not apply to the production vehicles selected under paragraph (h) of this section.

(2) Where it is expected that more than 33 percent of the vehicles in an engine family will be equipped with an optional item, the full estimated weight of that item shall be included, if required by the Administrator, in the curb weight computation for each vehicle available with that option in the engine family. Where it is expected that 33 percent or less of the vehicles in an engine family will be equipped with an item of optional equipment, no weight for that item will be added in computing curb weight. In the case of mutually exclusive options, only the weight of the heavier option will be added in computing curb weight. Optional equipment weighing less than 3 pounds per item need not be considered.

(3) Where it is expected that more than 33 percent of the vehicles in an engine family will be equipped with an item of optional equipment that can reasonably be expected to influence emissions, then such items of optional equipment shall actually be installed, unless specifically excluded by the Administrator, on all emission-data and durability-data vehicles in the engine family on which the option is intended to be offered in production. Optional equipment that can reasonably be expected to influence emissions are the air conditioner, power steering, power brakes and other items determined by the Administrator.

(4) Optional equipment that can reasonably be expected to influence emissions which is utilized on 33 percent or less of the vehicles in the engine family shall not be installed on any vehicle in that engine family unless specifically required under this section.

(h) *Alternative Durability Program durability-data vehicles.* Paragraph (h) of this section applies to light-duty vehicle and light-duty truck durability-data vehicles selected under the Alternative Durability Program. The Alternative Durability Program is described in § 86.081–13.

(1) In order to update the durability data to be used to determine a deterioration factor for each engine family group, the Administrator will select durability-data vehicles from the manufacturer's production line. Production vehicles will be selected from the 1981, 1982, and 1983 model year production of vehicles.

(i) The Administrator shall select the production durability-data vehicle designs from the designs that the manufacturer offers for sale. For each model year and for each engine family group, the Administrator may select production durability-data vehicle designs of equal number to the number of engine families within the engine family group, up to a maximum of three vehicles.

(ii) The production durability-data vehicles representing the designs selected in paragraph (h)(1)(i) of this section will be randomly selected from the manufacturer's production. The Administrator will make these random selections unless the manufacturer (with prior approval of the Administrator) elects to make the random selections.

(iii) The manufacturer may select additional production durability-data vehicle designs from within the engine family group. The production durability-data vehicles representing these designs shall be randomly selected from the manufacturer's production in accordance with paragraph (h)(1)(ii) of this section.

(iv) For each production durability-data vehicle selected under paragraph (h)(1) of this section, the manufacturer shall provide to the Administrator (before the vehicle is tested or begins service accumulation) the vehicle identification number. Before the vehicle begins service accumulation the manufacturer shall also provide the

Administrator with a description of the durability-data vehicle as specified by the Administrator.

(2) If, within an existing engine family group, a manufacturer requests to certify vehicles of a new design, engine family, emission control system, or with any other durability-related design difference, the Administrator will determine if the existing engine family group deterioration factor is appropriate for the new design. If the Administrator cannot make this determination or deems the deterioration factor not appropriate, the Administrator shall select preproduction durability-data vehicles under the provisions of paragraph (c) of this section. If vehicles are then certified using the new design, the Administrator may select production vehicles with the new design under the provisions of paragraph (h)(1) of this section.

(3) If a manufacturer requests to certify vehicles of a new design that the Administrator determines are a new engine family group, the Administrator shall select preproduction durability-data vehicles under the provisions of paragraph (c) of this section. If vehicles are then certified using the new design, the Administrator may select production vehicles of that design under the provisions of paragraph (h)(1) of this section.

8. A new § 86.082–26 is added. This section is identical to § 86.081–26 except for paragraphs (a)(3)(i)(B), (a)(3)(i)(C), (a)(3)(ii)(B), and (a)(3)(ii)(C), and the addition of paragraphs (a)(3)(i)(D) and (a)(3)(ii)(D).

§ 86.082–26 Mileage and service accumulation; emission measurements.

(a)(1) Paragraph (a) of this section applies to light-duty vehicles and light-duty trucks.

(2) The procedure for mileage accumulation will be the Durability Driving Schedule as specified in Appendix IV to this part. A modified procedure may also be used if approved in advance by the Administrator. Except with the advance approval of the Administrator, all vehicles will accumulate mileage at a measured curb weight which is within 100 pounds of the estimated curb weight. If the loaded vehicle weight is within 100 pounds of being included in the next higher inertia weight class as specified in § 86.129, the manufacturer may elect to conduct the respective emission tests at higher loaded vehicle weight.

(3) *Emission-data vehicles.* Unless as otherwise provided for in § 86.079–23(a), emission-data vehicles shall be operated and tested as follows:

(i) *Gasoline-fueled.* (A) Each gasoline-fueled emission-data vehicle shall be driven 4,000 miles with all emission control systems installed and operating. Complete exhaust emission tests shall be conducted at zero miles and 4,000 miles on those vehicles selected under § 86.082–24 (b)(1)(ii) through (b)(1)(v). Complete exhaust and evaporative emission tests shall be conducted at zero miles and 4,000 miles on those vehicles selected under § 86.082–24(b)(1)(vii). The manufacturer may at his option test the vehicles selected under § 86.082–24(b)(1)(vii) up to three times at the 4,000-mile test point as long as the ±250-mile test tolerance is adhered to. The Administrator may determine under § 86.082–24(f) that no testing is required.

(B) Emission tests for emission-data vehicle(s) selected for testing under § 86.082–24 (b)(1)(v) or (b)(1)(vii)(D) shall be conducted at 6,436 kilometers (4,000 miles) under high-altitude conditions.

(C) Exhaust and evaporative emission tests for emission-data vehicle(s) selected for testing under § 86.082–24(b)(1) (ii), (iii), (iv)(A), or (vii)(B) shall be conducted at the 6,436-kilometer (4,000-mile) test point under low-altitude conditions.

(D) For each engine family, the manufacturer will select one vehicle previously selected under § 86.082–24 (b)(1)(ii) through (b)(1)(iv) to be tested under high-altitude conditions. If the manufacturer recommends adjustments or modifications in order to conform to emission standards at high altitude, such adjustments or modifications shall be made to the test vehicle (in accordance with the instructions to be provided to the ultimate purchaser) before being tested under high-altitude conditions.

(ii)(A) *Diesel.* Each diesel emission-data vehicle shall be driven 6,436 kilometers (4,000 miles) with all emission control systems installed and operating. Emission tests shall be conducted at zero kilometers (zero miles) and 6,436 kilometers (4,000 miles).

(B) Emission tests for emission-data vehicles(s) selected for testing under § 86.082–24(b)(1)(v) shall be conducted at the 6,436-kilometer (4,000-mile) test point under high-altitude conditions.

(C) Emission tests for emission data vehicle(s) selected under § 86.082–24(b)(1) (ii), (iii), or (iv) shall be conducted at the 6,436-kilometer (4,000-mile) test point under low-altitude conditions.

(D) For each engine family, the manufacturer will select one vehicle previously selected under § 86.082–24 (b)(1)(ii) through (b)(1)(iv) to be tested under high-altitude conditions. If the manufacturer recommends adjustments or modifications in order to conform to emission standards at high altitude, such adjustments or modifications shall be made to the test vehicle (in accordance with the instructions to be provided to the ultimate purchaser) before being tested under high-altitude conditions.

(iii)(A) Vehicles tested for compliance under high-altitude conditions shall be tested at an elevation of 1,620 meters ±100 meters (5,315 feet±328 feet) or the equivalent observed barometric test conditions of 83.3±1 kilopascal.

(4) *Durability-data vehicles.* Unless as otherwise provided for in § 86.079–23(a), durability-data vehicles shall be operated and tested as follows:

(i) *Gasoline-fueled.* Each gasoline-fueled durability-data vehicle selected by the Administrator or elected by the manufacturer under § 86.082–24(c)(1) shall be driven, with all emission control systems installed and operating, for 50,000 miles or such lesser distance as the Administrator may agree to as meeting the objective of this procedure. Complete exhaust emission tests shall be made on all durability-data vehicles selected by the Administrator or elected by the manufacturer under § 86.082–24(c) at the following mileage points except as specified by paragraph (a)(4)(iii) of this section: 0; 5,000; 10,000; 15,000; 20,000; 25,000; 30,000; 35,000; 40,000; 45,000; 50,000. The Administrator may determine under § 86.082–24(f) that no testing is required.

(ii) *Diesel.* Each diesel durability-data vehicle shall be driven, with all emission control system installed and operating, for 50,000 miles or such lesser distance as the Administrator may agree to as meeting the objectives of the procedure. Complete emission tests (see §§ 86.106 through 86.145) shall be made at the following mileage points except as specified by paragraph (a)(4)(iii) of this section: 0; 5,000; 10,000; 15,000; 20,000; 25,000; 30,000; 35,000; 40,000; 45,000; and 50,000.

(iii) Production durability-data vehicles selected under § 86.082–24(h)(1) shall be driven and tested in accordance with paragraphs (a)(4)(i) and (a)(4)(ii) of this section with the exception that the emission test specified for the 5,000-mile point shall be conducted at the 4,000-mile point.

(5) All tests required by this subpart to be conducted after every 5,000 miles of driving for durability-data vehicles and 4,000 miles for emission-data vehicles must be conducted at any accumulated mileage within 250 miles of each of those test points.

(6)(i) The results of each emission test shall be supplied to the Administrator immediately after the test. The

manufacturer shall furnish to the Administrator explanation for voiding any test. The Administrator will determine if voiding the test was appropriate based upon the explanation given by the manufacturer for the voided test. If a manufacturer conducts multiple tests at any test point at which the data are intended to be used in the calculation of the deterioration factor, the number of tests must be the same at each point and may not exceed three valid tests. Tests between test points may be conducted as required by the Administrator. Data from all tests (including voided tests) shall be air posted to the Administrator within 24 hours (or delivered within 3 working days). In addition, all test data shall be compiled and provided to the Administrator in accordance with § 86.079–23. Where the Administrator conducts a test on a durability-data vehicle at a prescribed test point, the results of that test will be used in the calculation of the deterioration factor.

(ii) The results of all emission tests shall be rounded, using the "Rounding Off Method" specified in ASTM E 29–67, to the number of places to the right of the decimal point indicated by expressing the applicable emission standard of this subpart to three significant figures.

(7) Whenever the manufacturer proposes to operate and test a vehicle which may be used for emission or durability data, he shall provide the zero-mile test data to the Administrator (except for those vehicles for which the zero-mile test requirement has been waived under § 86.079–23(a)(2)) and make the vehicle available for such testing under § 86.081–29 as the Administrator may require before beginning to accumulate mileage on the vehicle. Failure to comply with this requirement will invalidate all test data submitted for this vehicle.

(8) Once a manufacturer begins to operate an emission-data or durability-data vehicle, as indicated by compliance with paragraph (a)(7) of this section, he shall continue to run the vehicle to 4,000 miles or 50,000 miles, respectively, and the data from the vehicle will be used in the calculations under § 86.082–28. Discontinuation of a vehicle shall be allowed only with the written consent of the Administrator.

(9)(i) The Administrator may elect to operate and test any test vehicle during all or any part of the mileage accumulation and testing procedure. In such cases, the manufacturer shall provide the vehicle(s) to the Administrator with all information necessary to conduct this testing.

(ii) The test procedures in §§ 86.106 through 86.145 will be followed by the Administrator. The Administrator will test the vehicles at each test point. Maintenance may be performed by the manufacturer under such conditions as the Administrator may prescribe.

(iii) The data developed by the Administrator for the engine-system combination shall be combined with any applicable data supplied by the manufacturer on other vehicles of that combination to determine the applicable deterioration factors for the combination. In the case of a significant discrepancy between data developed by the Administrator and that submitted by the manufacturer, the Administrator's data shall be used in the determination of deterioration factors.

(10) Emission testing of any type with respect to any certification vehicle other than that specified in this part is not allowed except as such testing may be specifically authorized by the Administrator.

(11) This section does not apply to testing conducted to meet the requirements of § 86.079–23(b)(2).

(b)(1) Paragraph (b) of this section applies to heavy-duty engines.

(2)(i) For gasoline-fueled engines, the dynamometer service accumulation schedule will consist of several operating conditions which give the percent loads and the modes as specified in the following chart. The percentage of time in each mode must be held within the limits specified. The maximum observed torque for each mode in the service accumulation cycle must be determined at the rpm at which the mode is being conducted. The percent load for that mode will be determined from the maximum torque at the rpm at which the mode is being conducted.

Mode	Observed torque (percentage of maximum observed)	Percentage of time
Idle	Idle	23 (22 to 24)
CT	CT	14 (13 to 15)
PTD	10	6 (5 to 7)
Cruise	25	31 (30 to 32)
PTA	55	15 (14 to 16)
FL	90	11 (10 to 12)

(ii) The equivalent control parameter for engine loading will be manifold vacuum, manifold pressure, or torque. Usage of one of the three parameters will require approval in advance by the Administrator. The control parameter values that correspond to the appropriate percent loads as specified in the emission test cycle will be initially determined at the zero-hour point or after an appropriate break-in procedure. The control parameter values determined initially will be used for the entire service accumulation schedule. If at any time during the service accumulation the 90 percent torque value cannot be attained, the engine shall be operated at wide-open throttle.

(iii) The average speed shall be between 1,650 and 1,700 rpm. Subject to the requirements as to average speed, there must be operation at speeds in excess of 3,200 rpm (but not in excess of governed speed for governed engines or rated speed for non-governed engines) for a cumulative maximum of 0.5 percent of the actual cycle time, excluding time in transient conditions. Maximum cycle time shall be 15 minutes. A cycle approved in advance by the Administrator shall be used.

(3)(i) For diesel engines, the following criteria must be met before service accumulation can begin. Failure to comply with these requirements shall invalidate all test data submitted for an engine.

(A) Each engine shall produce at least 95 percent of the maximum horsepower, corrected to rating conditions, at 95 to 100 percent of the rated speed.

(B) The fuel rate at maximum horsepower shall be within manufacturer's specifications.

(ii) During service accumulation, hours can be credited toward the required service accumulation hours when the following criteria are met. If these criteria cannot be met, engine operation shall be discontinued and the Administrator shall be notified immediately. (Adjustments to the fuel rate can be approved under the provisions of § 86.079–25.)

(A) Each engine shall produce at least 95 percent of the maximum horsepower, at 95 to 100 percent of the rated speed, observed at the zero-hour point. Horsepower values shall be corrected to the rating conditions.

(B) The engine shall be operated at 75 percent of the inlet and exhaust restrictions specified in § 86.879–8 except that the tolerance will be ±3 inches of water and ±0.5 inch of Hg respectively.

(C) During each emission test the inlet and exhaust restrictions shall be as specified in § 86.879–8.

(4) If a break-in procedure is used, the procedure must be the same as recommended to the ultimate purchaser. Prior approval by the Administrator is required for use of any break-in procedure. The hours accumulated during the break-in procedure will not be counted as part of the service accumulation.

(5) Emission-data engines: Each emission-data engine shall be operated for 125 hours with all emission control systems installed and operating. An emission test shall be conducted at 125 hours. A zero-hour emission may be performed after the engine has been approved by the Administrator to begin service accumulation. Evaporative emission controls need not be connected provided normal operating conditions are maintained in the engine induction system.

(6) Durability-data engines: Each gasoline-fueled durability-data engine shall be operated, with all emission control systems installed and operating, for 1,500 hours. Each diesel durability-data engine shall be operated for 1,000 hours. Emission measurement, as prescribed, shall be made at 125-hour intervals beginning at 125 hours of operation. A zero-hour emission test may be performed after the engine has been approved by the Administrator to begin service accumulation. Evaporative emission controls need not be connected provided normal operating conditions are maintained in the engine induction system.

(7) All tests required by this subpart to be conducted after 125 hours of operation or at any multiple of 125 hours may be conducted at any accumulated number of hours within 8 hours of 125 hours or the appropriate multiple of 125 hours respectively.

(8)(i) Data from all emission tests (including voided tests) shall be air posted to the Administrator within 72 hours (or delivered within 5 working days). The manufacturer shall furnish to the Administrator an explanation for voiding any test. The Administrator will determine if voiding the test was appropriate based upon the explanation given by the manufacturer for the voided test. If a manufacturer conducts multiple tests at any test point at which the data are intended to be used in the calculation of the deterioration factor, the number of tests must be the same at each point and may not exceed 3 valid tests. Tests between test points may be conducted as required by the Administrator. In addition, all test data shall be compiled and provided to the Administrator in accordance with § 86.079–23. Where the Administrator conducts a test on a durability-data engine at a prescribed test point, the results of that test will be used in the calculation of the deterioration factor.

(ii) The results of all emission tests shall be recorded and reported to the Administrator using two places to the right of the decimal point. These numbers shall be rounded in accordance with the "Rounding Off Method" specified in ASTM E 29–67.

(9) Whenever the manufacturer proposes to operate and test an engine which may be used for emission or durability data, he shall provide such information concerning components used on the engine as the Administrator may require and make the engine available for such testing under § 86.081–29 as the Administrator may require, before beginning to accumulate hours on the engine. Failure to comply with this requirement will invalidate all test data later submitted for this engine.

(10) Once a manufacturer begins to operate an emission-data or durability-data engine, as indicated by compliance with paragraph (b)(9) of this section, he shall continue to run any emission-data engine to 125 hours, any gasoline-fueled durability-data engine to 1,500 hours, and any diesel durability-data engine to 1,000 hours. The data from the engine will be used in the calculations under § 86.345. Discontinuation of an engine shall be allowed only with the prior written consent of the Administrator.

(11)(i) The Administrator may elect to operate and test any test engine during all or any part of the service accumulation and testing procedure. In such cases the manufacturer shall provide the engine(s) to the Administrator with all information necessary to conduct the testing.

(ii) The test procedure (Subpart D of this part for gasoline-fueled engines, and Subparts D and I of this part for diesel engines) will be followed by the Administrator. The Administrator will test the engines at each test point. Maintenance may be performed by the manufacturer under such conditions as the Administrator may prescribe.

(iii) The data developed by the Administrator for the engine-system combination shall be combined with any applicable data supplied by the manufacturer on other engines of that combination to determine the applicable deterioration factors for the combination. In the case of a significant discrepancy between data developed by the Administrator and that submitted by the manufacturer, the Administrator's data shall be used in the determination of deterioration factors.

(12) Emission testing of any type with respect to any certification engine other than that specified in this subpart is not allowed except as such testing may be specifically authorized by the Administrator.

9. Section 86.082–28 is amended by revising paragraph (a)(4)(i)(B).

§ 86.082–28 Compliance with emission standards.

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(a) * * *

(4) * * *

(i) * * *

(B) All applicable exhaust emission results shall be plotted as a function of the mileage on the system, rounded to the nearest mile, and the best fit straight lines, fitted by the method of least squares, shall be drawn through all these data points. The interpolated 4,000- and 50,000-mile points on this line must be within the low-altitude standards provided in § 86.082–8 or § 86.082–9 as applicable, or the data will not be acceptable for use in calculation of a deterioration factor, unless no applicable data point exceeded the standard. An exhaust emission deterioration factor shall be calculated for each engine-system combination as follows:

Factor = Exhaust emissions interpolated to 50,000 divided by exhaust emissions interpolated to 4,000 miles.

These interpolate values shall be carried out to a minimum of four places to the right of the decimal point before dividing one by the other to determine the deterioration factor. The results shall be rounded to three places to the right of the decimal point in accordance with ASTME 29–67.

* * * * *

10. A new § 86.082–30 is added. This section is identical to § 86.081–30 except for paragraph (a)(3), (a)(4)(i), (a)(4)(ii), (a)(5), (a)(6), (b)(1)(i)(B), and (b)(1)(i)(C).

§ 86.082–30 Certification.

(a)(1) If, after a review of the test reports and data submitted by the manufacturer, data derived from any inspection carried out under § 86.078–7(c), and any other pertient data or information, the Administrator determines that a test vehicle(s) (or test engine(s)) meet(s) the requirements of the Act and of this subpart, he will issue a certificate of conformity with respect to such vehicle(s) (or engine(s)) except in cases covered by paragraph (c) of this section.

(i) Each certificate of conformity shall state the altitudes(s) at which the vehicle(s) covered by the certificate has demonstrated compliance with the applicable emission standards.

(ii) [Reserved].

(2) Such certificate will be issued for such period not to exceed one model year as the Administrator may determine and upon such terms as he may deem necessary to assure that any new motor vehicle (or new motor vehicle engine) covered by the

certificate will meet the requirements of the Act and of this part. Each such certificate shall contain the following language:

This certificate covers only those new motor vehicles (or new motor vehicle engines) which conform, in all material respects, to the design specifications that apply to those vehicles (or engines) described in the application for certification and which are produced during the ———— model year production period of the said manufacturer, as defined in 40 CFR 86.082–2.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR §§ 86.078–7(c), 86–606, and 86.1006 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate as specified in 40 CFR § 86.082–30(c), (d), or (f). It is also a term of this certificate that this certificate may be revoked or suspended for the other reasons stated in § 86.082–30(c), (d), or (f).

(3) One such certificate will be issued for each engine family. For gasoline-fueled light-duty vehicles and light-duty trucks, one such certificate will be issed for each engine family-evaportative emission family combination. Each certificate will certify compliance with no more than one set of standards except for low-altitude standards and high-altitude standards. The certificate shall state that it covers vehicles sold or delivered to an ultimate purchaser for principal use at a designated high-altitude location only if the vehicle conforms in all material respect to the design specification that apply to those vehicles described in the application for certification at high altitude.

(4) The adjustment or modification of any light-duty vehicle and light-duty truck in accordance with instructions provided by the manufacturer as approved by EPA for the altitude where the vehicle is principally used will not be considered violation of Section 203(a)(3) of the Clean Air Act. A violation of Section 203(a)(1) of the Clean Air Act occurs when any manufacturer sells or delivers to an ultimate purchaser any light-duty vehicle or light-duty truck, subject to the regulations under the Act which is not configured to meet:

(i) High-altitude requirements:

(A) At a designated high-altitude location, unless such manufacturer has substantial reason to believe that such motor vehicle will not be used principally at a desingated high-altitude location; or

(B) At an other-than-designated high-altitude location, when such manufacturer has reason to believe that such motor vehicle will be used principally at a designated high-altitude location; or

(ii) Low-altitude requirements:

(A) At an other-than-designated high-altitude location, unless such manufacturer has substantial reason to believe that such motor vehicle will be used principally at a designated high-altitude location; or

(B) At a designated high-altitude location, when such manufacturer has reason to believe that such motor vehicle will be used principally at an other-than-designated high-altitude location.

(5) For the purpose of paragraph (a) of this section, "designated high-altitude location" is any county which has substantially all of its area located above 1,219 meters (4,000 feet) and which is identified below:

Counties Located Substantially Above 1,219 Meters (4,000 Feet) in Elevation

State of Arizona

Apache	Navajo
Cochise	Yavapai
Coconino	

State of Colorado

Adams	Kit Carson
Alamosa	Lake
Arapahoe	La Plata
Archuleta	Larimer
Boulder	Las Animas
Chaffee	Lincoln
Cheyenne	Mesa
Clear Creek	Mineral
Conejos	Moffat
Costilla	Montezuma
Crowley	Montrose
Custer	Morgan
Delta	Otero
Denver	Ouray
Dolores	Park
Douglas	Pitkin
Eagle	Pueblo
Elbert	Rio Blanco
El Paso	Rio Grande
Fremont	Routt
Garfield	Saguache
Gilpin	San Juan
Grand	San Miguel
Gunnison	Summit
Hinsdale	Teller
Huerfano	Washington
Jackson	Weld
Jefferson	

State of Idaho

Bannock	Franklin
Bear Lake	Fremont
Bingham	Jefferson
Blaine	Lemhi
Bonneville	Madison
Butte	Minidoka
Camas	Oneida
Caribou	Power
Cassia	Teton
Clark	Valley
Custer	

State of Montana

Beaverhead	Madison
Deer Lodge	Meagher
Gallatin	Park
Jefferson	Silver Bow
Judith Basin	Wheatland
Powell	

State of Nebraska

Banner	Kimball
Cheyenne	Sioux

State of Nevada

Carson City	Lyon
Douglas	Mineral
Elko	Nye
Esmeralda	Pershing
Eureka	Storey
Humboldt	Washoe
Lander	White Pine
Lincoln	

State of New Mexico

Bernalillo	Mora
Catron	Rio Arriba
Colfax	Roosevelt
Curry	Sandoval
De Baca	San Juan
Grant	San Miguel
Guadalupe	Santa Fe
Harding	Sierra
Hidalgo	Socorro
Lincoln	Taos
Los Alamos	Torrance
Luna	Union
McKinley	Valencia
Otero	

State of Oregon

Harney	Klamath
Lake	

State of Texas

Jeff Davis	Parmer
Hudspeth	

State of Utah

Beaver	Morgan
Box Elder	Piute
Cache	Rich
Carbon	Salt Lake
Daggett	San Juan
Davis	Sanpete
Duchesne	Sevier
Emery	Summit
Garfield	Tooele
Grand	Uintah
Iron	Utah
Juab	Wasatch
Kane	Wayne
Millard	Weber

State of Wyoming

Albany	Natrona
Campbell	Niobrara
Carbon	Park
Converse	Platte
Fremont	Sublette
Goshen	Sweetwater
Hot Springs	Teton
Johnson	Uinta
Laramie	Washakie
Lincoln	Weston

(6) The provisions of paragraph (a)(4) of this section shall not apply to any light-duty vehicle or light-duty truck sold, offered for sale, introduced, or delivered for introduction into commerce in California provided that the vehicle is covered by a certificate of conformity with emission standards in effect in California.

(7) Certificates issued for light-duty vehicles or light-duty trucks certified with catalytic converters shall be subject to the following term in addition

to the term in paragraph (a)(2) of this section: "Catalyst-equipped vehicles, otherwise covered by this certificate, which are driven outside the United States, Canada, and Mexico will be presumed to have been operated on leaded gasoline resulting in deactivation of the catalysts. If these vehicles are imported or offered for the importation without retrofit of the catalyst, they will be considered not to be within the coverage of this certificate unless included in a catalyst control program operated by a manufacturer or a United States Government Agency and approved by the Administrator."

(8) Certificates issued for incomplete light-duty trucks shall be subject to the following term in addition to the term in paragraph (a)(2) of this section: "For incomplete light-duty trucks, this certificate covers only those new motor vehicles which when completed by having the primary load-carrying device or container attached, conform to the maximum curb weight and frontal area limitations described in the application for certification as required in 40 CFR 86.082–21 (d)."

(9) Certificates issued for heavy-duty engines shall be subject to the following term in addition to the term in paragraph (a)(2) of this section: "For heavy-duty engines, this certificate covers only those new motor vehicle engines installed in heavy-duty vehicles which conform to the minimum gross vehicle weight rating, curb weight, or frontal area limitations for heavy-duty vehicles described in 40 CFR 86.082–2."

(b)(1) The Administrator will determine whether a vehicle (or engine) covered by the application complies with applicable standards by observing the following relationships:

(i) *Light-duty vehicles and light-duty trucks.* (A) The durability data vehicle(s) selected under § 86.082–24(c)(1)(i) shall represent all vehicles of the same engine-system combination.

(B) The emission-data vehicle(s) selected under § 86.082–24(b)(1)(ii) through (b)(1)(v) shall represent all vehicles of the same engine-system combination as applicable.

(C) The emission-data vehicle(s) selected under § 86.082–24(b)(1)(vii) shall represent all vehicles of the same evaporative control system within the evaporative emission family, as applicable.

(D) The emisison-data vehicle(s) selected under § 86.082–24(b)(1)(v) shall represent all vehicles of the same engine-system combination to be sold at high altitude.

(E) The emission-data vehicle(s) selected under § 86.082–24(b)(1)(vii)(D) shall represent all vehicles of the same evaporative control system within the evaporative family sold at high altitude.

(ii)(A) *Gasoline-fueled heavy-duty engines.* A test engine selected under § 86.082–24(b)(2)(ii) and (iv) shall represent all engines in the same engine family of the same engine displacement-exhaust emission control system combination.

(B) A test engine selected under § 86.082–24(b)(2)(iii) shall represent all engines in the same engine family of the same engine displacement-exhaust emission control system combination.

(C) A test engine selected under § 86.082–24(c)(2)(i) shall represent all engines of the same engine-system combination.

(iii)(A) *Diesel heavy-duty engines.* A test engine selected under § 86.082–24(b)(3)(ii) shall represent all engines in the same engine-system combination.

(B) A test engine selected under § 86.082–24(b)(3)(iii) shall represent all engines of that emission control system at the rated fuel delivery of the test engines.

(C) A test engine selected under § 86.082–24(c)(3)(i) shall represent all engines of the same engine-system combination.

(2) The Administrator will proceed as in paragraph (a) of this section with respect to the vehicles (or engines) belonging to an engine family or engine family-evaporative emission family combination (as applicable), all of which comply with all applicable standards.

(3) If, after a review of the test reports and data submitted by the manufacturer, data derived from any additional testing conducted pursuant to § 86.079–29, data or information derived from any inspection carried out under § 86.078–7(c) or any other pertinent data or information, the Administrator determines that one or more test vehicles (or test engines) of the certification test fleet do not meet applicable standards, he will notify the manufacturer in writing, setting forth the basis for his determination. Within 30 days following receipt of the notification, the manufacturer may request a hearing on the administrator's determination. The request shall be in writing, signed by an authorized representative of the manufacturer and shall include a statement specifying the manufacturer's objections to the Administrator's determination and data in support of such objections. If, after a review of the request and supporting data, the Administrator finds that the request raises a substantial factual issue, he shall provide the manufacturer a hearing in accordance with § 86.078–6 with respect to such issue.

(4) For light-duty vehicles and light-duty trucks the manufacturer may, at his option, proceed with any of the following alternatives with respect to an emission-data vehicle determined not in compliance with all applicable standards for which it was tested:

(i) Request a hearing under § 86.078–6; or

(ii) Remove the vehicle configuration (or evaporative vehicle configuration, as applicable) which failed, from his application;

(A) If the failed vehicle was tested for compliance with exhaust emission standards only: The Administrator may select, in place of the failed vehicle, in accordance with the selection criteria employed in selecting the failed vehicle, a new emission-data vehicle to be tested for exhaust emission compliance only.

(B) If the failed vehicle was tested for compliance with both exhaust and evaporative emission standards: The Administrator may select, in place of the failed vehicle, in accordance with the selection criteria employed in selecting the failed vehicle, a new emission-data vehicle which will be tested for compliance with both exhaust and evaporative emission standards. If one vehicle cannot be selected in accordance with the selection criteria employed in selecting the failed vehicle, then two vehicles may be selected (i.e., one vehicle to satisfy the exhaust emission vehicle selection criteria and one vehicle to satisfy the evaporative emission vehicle selection criteria). The vehicle selected to satisfy the exhaust emission vehicle selection criteria will be tested for compliance with exhaust emission standards only. The vehicle selected to satisfy the evaporative emission vehicle selection criteria will be tested for compliance with both exhaust and evaporative emission standards; or

(iii) Remove the vehicle configuration (or evaporative vehicle configuration, as applicable) which failed from the application and add a vehicle configuration(s) (or evaporative vehicle configuration(s), as applicable) not previously listed. The Administrator may require, if applicable, that the failed vehicle be modified to the new engine code (or evaporative emission code, as applicable) and demonstrate by testing that it meets applicable standards for which it was originally tested. In addition, the Administrator may select, in accordance with the vehicle selection criteria given in § 86.082–24(b), a new emission-data vehicle or vehicles. The vehicles selected to satisfy the exhaust emission vehicle selection criteria will be tested for compliance with exhaust emission standards only. The vehicles

selected to satisfy the evaporative emission vehicle selection criteria will be tested for compliance with both exhaust and evaporative emission standards; or

(iv) Correct a component or system malfunction and show that with a correctly functioning system or component the failed vehicle meets applicable standards for which it was originally tested. The administrator may require a new emission-data vehicle, of identical vehicle configuration (or evaporative vehicle configuration, as applicable) to the failed vehicle, to be operated and tested for compliance with the applicable standards for which the failed vehicle was originally tested.

(5) For heavy-duty engines the manufacturer may, at his option, proceed with any of the following alternatives with respect to any engine family represented by a test engine(s) determined not in compliance with applicable standards:

(i) Request a hearing under § 86.078–6; or

(ii) Delete from the application for certification the engines represented by the failing test engine. (Engines so deleted may be included in a later request for certification under 86.079–32.) The Administrator will then select in place of each failing engine an alternate engine chosen in accordance with selection criteria employed in selecting the engine that failed; or

(iii) Modify the test engine and demonstrate by testing that it meets applicable standards. Another engine which is in all material respects the same as the first engine, as modified, shall then be operated and tested in accordance with applicable test procedures.

(6) If the manufacturer does not request a hearing or present the required data under paragraphs (b)(4) or (b)(5) (as applicable) of this section, the Administrator will deny certification.

(c)(1) Not withstanding the fact that any certification vehicle(s) (or certification engine(s)) may comply with other provisions of this subpart, the Administrator may withhold or deny the issuance of a certificate of conformity (or suspend or revoke any such certificate which has been issued) with respect to any such vehicle(s) (or engine(s)) if:

(i) The manufacturer submits false or incomplete information in his application for certification thereof;

(ii) The manufacturer renders inaccurate any test data which he submits pertaining thereto or otherwise circumvents the intent of the Act, or of this part with respect to such vehicle (or engine);

(iii) Any EPA Enforcement Officer is denied access on the terms specified in § 86.078–7(c) to any facility or portion thereof which contains any of the following:

(A) The vehicle (or engine);

(B) Any components used or considered for use in its modification or buildup into a certification vehicle (or certification engine);

(C) Any production vehicle (or production engine) which is or will be claimed by the manufacturer to be covered by the certificate;

(D) Any step in the construction of a vehicle (or engine) described in (C) of this subdivision;

(E) Any records, documents, reports, or histories required by this part to be kept concerning any of the above;

(iv) Any EPA Enforcement Officer is denied "reasonable assistance" (as defined in § 86.078–7(c)) in examining any of the items listed in paragraph (c)(1)(iii) of this section.

(2) The sanctions of withholding, denying, revoking, or suspending of a certificate may be imposed for the reasons in paragraphs (c)(1)(i), (ii), (iii), or (iv) of this section only when the infraction is substantial.

(3) In any case in which a manufacturer knowingly submits false or inaccurate information or knowingly renders inaccurate or invalid any test data or commits any other fraudulent acts and such acts contribute substantially to the Administrator's decision to issue a certificate of conformity, the Administrator may deem such certificate void ab initio.

(4) In any case in which certification of a vehicle (or engine) is proposed to be withheld, denied, revoked, or suspended under paragraph (c)(1)(iii) or (c)(1)(iv) of this section, and in which the Administrator has presented to the manufacturer involved reasonable evidence that a violation of § 86.078–7(c) in fact occurred, the manufacturer, if he wishes to contend that, even though the violation occurred, the vehicle (or engine) in question was not involved in the violation to a degree that would warrant withholding denial, revocation, or suspension of certification under either paragraph (c)(1)(iii) or (c)(1)(iv) of this section, shall have the burden of establishing that contention to the satisfaction of the Administrator.

(5) Any revocation or suspension of certification under paragraph (c)(1) of this section shall:

(i) Be made only after the manufacturer concerned has been offered an opportunity for a hearing conducted in accordance with § 86.078–6 hereof.

(ii) Extend no further than to forbid the introduction into commerce of vehicles (or engines) previously covered by the certification which are still in the hands of the manufacturer, except in cases of such fraud or other misconduct as makes the certification invalid ab initio.

(6) The manufacturer may request in the form and manner specified in paragraph (b)(3) of this section that any determination made by the Administrator under paragraph (c)(1) of this section to withhold or deny certification be reviewed in a hearing conducted in accordance with § 86.078–6. If the Administrator finds, after a review of the request and supporting data, that the request raises a substantial factual issue, he will grant the request with respect to such issue.

(d)(1) Notwithstanding the fact that any vehicle configuration or engine family may be covered by a valid outstanding certificate of conformity, the Administrator may suspend such outstanding certificate of conformity in whole or in part with respect to such vehicle configuration or engine family if:

(i) The manufacturer refuses to comply with the provisions of a test order issued by the Administrator pursuant to § 86.603; or

(ii) The manufacturer refuses to comply with any of the requirements of § 86.603; or

(iii) The manufacturer submits false or incomplete information in any report or information provided pursuant to the requirements of § 86.609; or

(iv) The manufacturer renders inaccurate any test data which he submits pursuant to § 86.609; or

(v) Any EPA Enforcement Officer is denied access to a facility on the terms specified in § 86.606; or

(vi) Any EPA Enforcement Officer is denied the opportunity on the terms specified in § 86.606, to:

(A) Monitor vehicle selection pursuant to § 86.607, or

(B) Select vehicles for testing pursuant to § 86.607, or

(C) Monitor vehicle testing performed to satisfy any of the requirements of this part; or

(vii) Any EPA Enforcement Officer is denied "reasonable assistance" as defined in § 86.606 in examining any of the items listed in that section; or

(viii) The manufacturer refuses to comply with the requirements of §§ 86.604(a), 86.605, and 86.607, 86.608, 86.610, or 86.611.

(2) The sanction of suspending a certificate may not be imposed for the reasons in paragraphs (d)(1) (i), (ii), or (viii) of this section where such refusal is caused by conditions and

circumstances outside the control of the manufacturer which renders it impossible to comply with those requirements. Such conditions and circumstances shall include, but not be limited to, any uncontrollable factors which results in the temporary unavailability of equipment and personnel needed to conduct the required tests, such as equipment breakdown or failure or illness of personnel, but shall not include failure of the manufacturer to adequately plan for and provide the equipment and personnel needed to conduct the tests. The manufacturer will bear the burden of establishing the presence of the conditions and circumstances required by this paragraph.

(3) The sanctions of suspending a certificate may be imposed for the reasons in paragraphs (d)(1) (iii), (iv), (v), (vi), or (vii) of this section only when the infraction is substantial.

(4) In any case in which a manufacturer knowingly submitted false or inaccurate information or knowingly rendered inaccurate any test data or committed any other fraudulent acts, and such acts contributed substantially to the Administrator's original decision not to suspend or revoke a certificate of conformity in whole or in part, the Administrator may deem such certificate void from the date of such fraudulent act.

(5) In any case in which certification of a vehicle is proposed to be suspended under paragraph (d)(1)(v), (d)(1)(vi), or (d)(1)(vii) of this section, and in which the Administrator has presented to the manufacturer involved reasonable evidence that a violation of § 86.606 in fact occurred, the manufacturer, if he wishes to contend that even though the violation occurred, the vehicle configuration or engine family in question was not involved in the violation to the degree that would warrant suspension of certification under either paragraph (d)(1)(v), (d)(1)(vi), or (d)(1)(vii) of this section, shall have the burden of establishing that contention to the satisfaction of the Administrator.

(6) Any suspension of certification under paragraph (d)(1) of this section shall:

(i) Be made only after the manufacturer concerned has been offered an opportunity for a hearing conducted in accordance with § 86.613 hereof, and

(ii) Not apply to vehicles no longer in the hands of the manufacturer.

11. A new § 86.082–35 is added. This section is identical to § 86.081–35 except for paragraphs (a)(1)(iii)(D) and (a)(1)(iii)(F), and (a)(1)(iii)(G).

§ 86.082–35 Labeling.

(a) The manufacturer of any motor vehicle (or motor vehicle engine) subject to the applicable emission standards of this subpart, shall, at the time of manufacture, affix a permanent legible label, of the type and in the manner described below, containing the information hereinafter provided, to all production models of such vehicles (or engines) available for sale to the public and covered by a certificate of conformity under § 86.082–30(a).

(1) *Light-duty vehicles and light-duty trucks.* (i) A permanent, legible label shall be affixed in a readily visible position in the engine compartment.

(ii) The label shall be affixed by the vehicle manufacturer who has been issued the certificate of conformity for such vehicle, in such a manner that it cannot be removed without destroying or defacing the label. The label shall not be affixed to any equipment which is easily detached from such vehicle.

(iii) The label shall contain the following information lettered in the English language in block letters and numerals, which shall be of a color that contrasts with the background of the label:

(A) The label heading: Vehicle Emission Control Information;

(B) Full corporate name and trademark of manufacturer;

(C) Engine displacement (in cubic inches), engine, family identification and evaporative family identification;

(D) Engine tune-up specifications and adjustment, as recommended by the manufacturer in accordance with the altitude at which the vehicle is to be sold for principal use to the ultimate purchaser, including but not limited to idle speed(s), ignition timing, the idle air-fuel mixture setting procedure and value; e.g., idle CO, idle air-fuel ratio, idle speed drop, high idle speed, initial injection timing, and valve lash (as applicable), as well as other parameters deemed necessary by the manufacturer. These specifications should indicate the proper transmission position during tune-up and what accessories (e.g., air conditioner), if any should be in operation. If adjustments or modifications to the vehicle are necessary to ensure compliance with emission standards at either high or low altitude, the manufacturer shall either include the instructions for such adjustments on the label, or indicate on the label where instructions for such adjustments may be found. The label shall indicate whether the engine tune-up or adjustment specifications are applicable to high altitude, low altitude or both.

(E) An unconditional statement of compliance with the appropriate model year U.S. Environmental Protection Agency regulations which apply to light-duty vehicles;

(F) A statement, if applicable, that the adjustments or modifications indicated on the label are necessary to ensure emission control compliance at the altitude specified.

(G) A statement, if applicable, that the high-altitude vehicle was designed or modified for principal use at high altitude. This statement must be affixed by the manufacturer at the time of assembly or by any dealer who performs the high-altitude modification or adjustment prior to sale to an ultimate purchaser.

(H) A statement, if applicable, that the vehicle has been exempted from meeting the high-altitude gaseous emission standards as specified in § 86.082–8(g)(2) and § 86.083–9(g)(2), and that its unsatisfactory performance under high-altitude conditions makes it unsuitable for principal use at high altitude.

(I) A statement, if applicable, that the vehicle has been exempted from meeting the high-altitude gaseous emissions standards as specified in § 86.082–9(g)(2) and, as a consequence, the emission performance warranty provisions of 40 CFR Part 85, Subpart V do not apply when the vehicle is tested at high altitude.

(2) *Heavy-duty engines.* (i) A permanent legible label shall be affixed to the engine in a position in which it will be readily visible after installation in the vehicle.

(ii) The label shall be attached to an engine part necessary for normal engine operation and not normally requiring replacement during engine life.

(iii) The label shall contain the following information lettered in the English language in block letters and numerals which shall be of a color that contrasts with the background of the label:

(A) The label heading: Engine Exhaust Emission Control Information;

(B) Full corporate name and trademark of manufacturer;

(C) Engine displacement (in cubic inches) and engine family and model designations;

(D) Date of engine manufacture (month and year);

(E) Engine specifications and adjustments as recommended by the manufacturer. These specifications should indicate the proper transmission position during tuneup and what accessories (e.g., air conditioner), if any, should be in operation;

(F) For gasoline-fueled engines the label should include the idle speed,

ignition timing, and the idle air-fuel mixture setting procedure and value (e.g., idle CO, idle air-fuel ratio, idle speed drop), and valve lash.

(G) For diesel engines the label should include the advertised hp at rpm, fuel rate at advertised hp in mm ^{3} stroke, valve lash, initial injection timing, and idle speed.

(H) An unconditional statement of compliance wih appropriate model year (e.g., 1979) U.S. Environmental Protection Agency regulations applicable to heavy-duty engines.

(iv) The label may be made up of one or more pieces; *Provided,* That all pieces are permanently attached to the same engine or vehicle part as applicable.

(b) The provisions of this section shall not prevent a manufacturer from also reciting on the label that such vehicle (or engine) conforms to any applicable state emission standards for new motor vehicles (or new motor vehicle engines) or any other information that such manufacturer deems necessary for, or useful to, the proper operation and satisfactory maintenance of the vehicle (or engine).

(c)(1) The manufacturer of any light-duty vehicle or light-duty truck subject to the emission standards of this subpart shall, in addition and subsequent to setting forth those statements on the label required by the Department of Transportation (DOT) pursuant to 49 CFR 567.4, set forth on the DOT label or on an additional label located in proximity to the DOT label and affixed as described in 40 CFR 567.4(b), the following information in the English language, lettered in block letters and numerals not less than three thirty-seconds of an inch high, of a color that contrasts with the background of the label:

(i) The Heading: "Vehicle Emission Control Information."

(ii) The statement: "This Vehicle Conforms to U.S. EPA Regulations Applicable to 19— Model Year New Motor Vehicles."

(iii) One of the following statements, as applicable, in letters and numerals not less than six thirty-seconds of an inch high and of a color that contrasts with the background of the label:

(A) For all vehicles certified as non-catalyst-equipped: "Non-Catalyst"

(B) For all vehicles certified as catalyst-equipped which are included in a manufacturer's catalyst control program for which approval has been given by the Administrator: "Catalyst—Approved for Import"

(C) For all vehicles certified as catalyst-equipped which are not included in a manufacturer's catalyst control program for which prior approval has been given by the Administrator: "Catalyst"

(2) In lieu of selecting either of the labeling options of paragraph (c)(1) of this section, the manufacturer may add the information required by paragraph (c)(1)(iii) of this section to the label required by paragraph (a) of this section. The required information will be set forth in the manner prescribed by paragraph (c)(1)(iii) of this section.

(d)(1) Incomplete light-duty trucks or incomplete heavy-duty vehicles optionally certified as light-duty trucks shall have the following prominent statement printed on the label required in paragraph (a)(1) of this section in lieu of the statement required by paragraph (a)(1)(iii)(E) of this section: "This vehicle conforms to U.S. EPA regulations applicable to 19— Model Year New Motor Vehicles when completed at a maximum curb weight of —— pounds and a maximum frontal area of — square feet."

(e) Incomplete heavy-duty vehicles having an 8,500 pound gross vehicle weight rating or less shall have the following statement printed on the label required in paragraph (a)(2) of this section in lieu of the statement required by paragraph (a)(2)(iii)(H) of this section: "This engine conforms to U.S. EPA regulations applicable to 19— Model Year New Heavy-Duty Engines when installed in a vehicle completed at a curb weight of more than 6,000 pounds or with a frontal area greater than 45 square feet."

(f) The manufacturer of any incomplete vehicle shall notify the purchaser of such vehicle of any curb weight, frontal area, or gross vehicle weight rating limitations affecting the emission certificate applicable to that vehicle. This notification shall be transmitted in a manner consistent with National Highway Traffic Safety Administration safety notification requirements published in 49 CFR Part 568.

12. A new § 86.082–38 is added. This section is identical to § 86.079–38 except for paragraphs (c)(2) and (d)(2).

§ 86.082–38 Maintenance instructions.

(a) The manufacturer shall furnish or cause to be furnished to the purchaser of each new motor vehicle (or motor vehicle engine) subject to the standards prescribed in §§ 86.082–8, 86.082–9, 86.079–10, or 86.079–11, as applicable, written instructions for the maintenance and use of the vehicle (or engine) by the purchaser as may be reasonable and necessary to assure the proper functioning of the emission control system.

(1) Such instructions shall be provided for those vehicle and engine components listed in Appendix VI to this part (and for any other components) to the extent that maintenance of these components is necessary to assure the proper functioning of emission control system.

(2) Such instructions shall be in clear, and to the extent practicable, nontechnical language.

(b) The maintenance instructions required by this section shall contain a general description of the documentation which the manufacturer will require from the ultimate purchaser or any subsequent purchaser as evidence of compliance with the instructions.

(c) For gasoline-fueled light-duty vehicles and light-duty trucks.

(1) Such instructions shall specify the performance of all scheduled maintenance performed by the manufacturer under § 86.079–25(a), and shall explain the conditions under which EGR system and catalytic converter maintenance are to be performed (e.g., what type of warning device is being employed and whether the device is activated by component failure or the need for periodic maintenance).

(2) Such instructions shall indicate what adjustments or modifications, if any, are necessary to allow the vehicle to meet applicable emission standards at elevations above 4,000 feet, or at elevations of 4,000 feet or less.

(3) [Reserved]

(d) For diesel light-duty vehicles and light-duty trucks.

(1) Such instructions shall specify the performance of all scheduled maintenance performed by the manufacturer under § 86.079–25(a) and shall explain the conditions under which EGR system and catalytic converter maintenance are to be performed (e.g., what type of warning device is being employed and whether the device is activated by component failure or the need for periodic maintenance).

(2) Such instructions shall indicate what adjustments or modifications, if any, are necessary to allow the vehicle to meet applicable emission standards at elevations above 4,000 feet, or at elevations of 4,000 feet or less.

(e) For gasoline-fueled heavy-duty engines, such instructions shall specify the performance of all scheduled maintenance performed by the manufacturer under § 86.079–25(c)(2). Scheduled maintenance in addition to that performed on the durability-data engine under § 86.079–25(c)(2) may be recommended for reasons such as to offset the effects of operating conditions which differ from the dynamometer durability cycle or to increase the life of

the engine beyond 1,500 hours (or the equivalent). The instructions may schedule maintenance on a calendar time basis and/or mileage basis in addition to the engine service time basis that was followed by the manufacturer under § 86.079–25(c)(2).

(f) For diesel heavy-duty engines, such instructions shall specify the performance of all scheduled maintenance performed by the manufacturer under § 86.079–25(c)(2). Scheduled maintenance in addition to that performed on the durability-data engine under § 86.079–25(c)(2) may be recommended for reasons such as to offset the effects of operating conditions which differ from the dynamometer durability cycle or to increase the life of the engine beyond 1,000 hours (or the equivalent). The instructions may schedule maintenance on a calendar time basis, mileage basis, engine service time basis, or combinations of each.

13. A new § 86.083–9 is added. This section is identical to § 86.082–9 except for paragraphs (a)(1), (d), (e), (f), and (g).

§ 86.083–9 Emission standards for 1983 and later model year light-duty trucks.

(a)(1) The standards set forth in paragraphs (a) through (c) of this section shall apply for trucks sold for principal use at other-than-designated high-altitude locations. Exhaust emissions from 1983 and later model year light-duty trucks shall not exceed:

(i) *Hydrocarbons.* 1.7 gram per vehicle mile (1.06 gram per vehicle kilometer);

(ii) *Carbon Monoxide.* 18 grams per vehicle mile (11.16 grams per vehicle kilometer);

(iii) *Oxides of Nitrogen.* 2.3 grams per vehicle mile (1.43 grams per vehicle kilometer);

(iv) *Particulate Emissions* (diesels only). 0.60 gram per vehicle mile (0.373 gram per vehicle kilometer).

(2) The standards set forth in paragraphs (a)(1) of this section refer to the exhaust emitted over a driving schedule as set forth in Subpart B and measured and calculated in accordance with those procedures.

(b)(1) Fuel evaporative emissions from 1983 and later model year gasoline-fueled light-duty trucks shall not exceed:

(i) *Hydrocarbons.* 2.0 grams per test.

(2) The standard set forth in paragraph (b)(1) of this section refers to a composite sample of the fuel evaporative emissions collected under the conditions set forth in Subpart B and measured in accordance with those procedures.

(c) No crankcase emissions shall be discharged into the ambient atmosphere from any 1983 and later model year light-duty truck.

(d)(1) Model year 1983 and later light-duty trucks sold for principal use at designated high-altitude locations shall be capable of meeting the following exhaust emission standards when tested under high-altitude conditions.

(i) *Hydrocarbons.* 2.0 grams per vehicle mile (1.24 grams per vehicle kilometer);

(ii) *Carbon monoxide.* 26 grams per vehicle mile (16.2 grams per vehicle kilometer);

(iii) *Oxides of nitrogen.* 2.3 grams per vehicle mile (1.43 grams per vehicle kilometer).

(2) The standards set forth in paragraph (d)(1) of this section refer to the exhaust emitted over a driving schedule as set forth in Subpart B of this part and measured and calculated in accordance with those procedures.

(e)(1) Fuel evaporative emissions from 1983 and later model year gasoline-fueled light-duty trucks sold for principal use at designated high-altitude locations shall not exceed 2.6 grams per test when tested under high-altitude conditions.

(2) The standard set forth in paragraph (e)(1) of this section refers to a composite sample of the fuel evaporative emission collected under the conditions set forth in Subpart B of this part and measured in accordance with those procedures.

(f) No crankcase emissions shall be discharged into the ambient atmosphere from; any 1983 and later model year gasoline-fueled light-duty trucks sold for principal use at designated high-altitude locations.

(g)(1) All light-duty trucks shall be capable (by initial design, adjustment, or modification) of meeting the applicable emission standards set forth in this section for any altitude of operation. Such adjustments and modifications shall:

(i) Be capable of being effectively performed by commercial repair facilities.

(ii) All adjustment and modifications recommended by the manufacturer to be performed on vehicles to satisfy this requirement must be approved in advance by EPA in accordance with § 86.079–22.

(g)(2) Exemption for vehicles from the high-altitude emission standards as set forth in paragraph (d) of this section may be granted by the Administrator for vehicles that are expected to have unsatisfactory performance under high-altitude conditions. Such exemptions will be granted upon petition by the manufacturer that the vehicle falls within the definition of vehicles eligible for exemption. A vehicle shall be considered eligible for exemption if its design parameters (displacement-to-weight ratio (D/W) and engine speed-to-vehicle speed (N/V)) simultaneously fall within the exempted range for that manufacturer for that year. The exempted range is determined according to the following procedure:

(i) The manufacturer shall graphically display the D/W and N/V data of all vehicle configurations it will offer for the model year in question. The axis of the abscissa shall be D/W (where (D) is the engine displacement expressed in cubic centimeters and (W) is the equivalent vehicle test weight expressed in pounds), and the axis of the ordinate shall be N/V (where (N) is the crank shaft speed expressed in revolutions per minute and (V) is the vehicle speed expressed in miles per hour). At the manufacturer's option, either the 1:1 transmission gear ratio or the lowest numerical gear ratio available in the transmission will be used to determine N/V. The gear selection must be the same for all N/V data points on the manufacturer's graph. For each transmission/axle ratio combination, only the lowest N/V value shall be used in the graphical display.

(ii) The product line is then defined by the equation, $N/V = C(D/W)^{-0.9}$, where the constant, (C), is determined by the requirement that all the vehicle data points either fall on the line or lie to the upper right of the line as displayed on the graph.

(iii) The exemption line is then defined by the equation, $N/V = C(0.84\ D/W)^{-0.9}$, where the constant, (C), is the same as that found in paragraph (g)(2)(ii) of this section.

(iv) The exempted range includes all values of N/V and D/W which simultaneously fall to the lower left of the exemption line as drawn on the graph.

(3) The sale of a vehicle for principal use at a designated high-altitude location that has been exempted as set forth in paragraph (g)(2) of this section will be considered a violation of § 203(a)(1) of the Clean Air Act.

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